AUG 2 1917
UNIV. OF MICH. LIBRARY

MACHINERY ISSUE

THE IRON TRADE REVIEW

Single Copies 15 Cents | CLEVELAND, AUGUST 2, 1917 | Four Dollars a Year

ATLAS CARS

Atlas Cars and Electric Locomotives insure rapid handling and transportation.

Send us your inquiry for Cars, Locomotives, or anything in Industrial Railway Equipment.

No. 284
Billet or Ingot Car, Heavy Type

No. 180
Electric Bottom Dump Scale Car

No. 5785
Storage Baftery Crane Truck

We furnish Cars complete with motor and trolley, or storage batteries.

Let us know your requirements—our engineering department is at your service.

There is an *Atlas Car* that will take care of your particular requirements better than any other car you have ever tried.

Let us prove it to you.

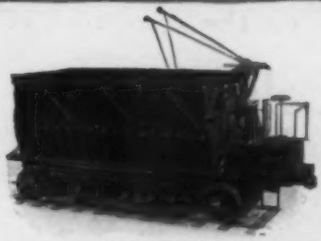
No. 265-E
Electric Ore Transfer Car

No. 161-P
Gable Bottom Pig Iron, heavy construction, Standard Gauge

No. 7050
Storage Battery Truck

No. 217-H
Side Dump Car, heavy construction for steam shovel use

No. 6500
Contractors' Electric Locomotive



No. 163-E
Electric Ore Car, with pneumatic door opening device and air brake

No. 5625
Storage Battery Locomotive for Industrial use

No. 288
All Steel Mill Car

The Atlas Car & Mfg. Co.
CLEVELAND, OHIO

No. 296
Wood Platform Double Truck Car

Advertisers' Index, page 168. Contents, page 87. "Where-to-Buy," page 98.
Engineering Directory, page 144. Classified Advertisements, pages 153-167.

H. KOPPERS COMPANY

Builders of

By-Product Coke and Gas Ovens
Benzol Recovery Plants
Tar Distilling Plants
Direct Process for Manufacture of Ammonium Sulphate
Ammonia Stills

CONSULTING ENGINEERS

on the operation of

By-Product Coke Plants and Auxiliaries

UNION ARCADE BUILDING
PITTSBURGH, PA.

Say you saw it in THE IRON TRADE REVIEW

THE IRON TRADE REVIEW

Vol. LXI Cleveland, August 2, 1917 *No. 5*

New Conditions Bring Readjustment

Completion of Three Years of an Unparalleled War Market is Signalized by Appearance of Dissimilar Set of Controlling Factors—Waiting Conditions Prevail—Government Places Heavy Tonnages in All Lines

AS THE most extraordinary of three war years in iron and steel is rounded out, the contrast between the underlying market conditions of the past and those now developing more sharply is drawn. The relation of supply and demand which since Aug. 1, 1914, has raised prices from 250 to 800 per cent has been modified by an entirely new set of circumstances. The open world's market has been narrowed by export embargo. The national government has been transformed from a virtually disinterested to the dominant factor both in the acquirement of tonnage and in the control of prices. The heavy purchasing volume of the allies, which has been chief among the price stimulants of the past three years, is to be co-ordinated with that of this country and probably will be subject to similar price consideration. Under these conditions the market is enveloped by a process of readjustment. Fresh buying and price advances continue under check and a waiting situation generally prevails.

Raise Price Questions

With the federal trade commission's report on steel costs a matter of months in the future, new questions relating to prices on future deliveries both for the government and for the outside trade are being raised. Provisos in government orders for material not previously arranged for that the prices stipulated are subject to later adjustment, has caused some makers to take a position that a distinction should be made between shipped and unshipped tonnage. Private buyers have been endeavoring to commit the mills to a policy of protection against price decline on unshipped tonnage. The latter, however, have refused to extend such a privilege and are insisting that all purchases be made on a closed basis. Statements of heavier buying by the government have come from all quarters this week. For the construction of supply lines behind the American front in France, 150,000 tons of bessemer rails have been bought. Large quantities of light rails and track fastenings still are to be placed. Sheet orders have been raised to 100,000 to 125,000 tons. From 20,000 to 25,000 kegs additional of wire nails for government camps have been distributed at $3.20 per keg. The total for the various cantonments now is placed at 70,000 to 75,000 kegs. Large lots of iron and steel pipe for camp purposes have been closed. An interesting announcement is that the government has reconsidered its decision and will proceed with the taking of bids for the armor plate plant at Charleston, W. Va. About 25,000 tons of steel will be required. The French government with the assistance of the general steel committee has placed 60,000 to 70,000 tons of tank and boiler plates at considerably under the market. The opinion grows that the government is not likely to undertake a policy of general price-fixing. It is probable, however, that government purchases at special prices will include tonnages for the allies, provided these are placed through Washington authorities. Centralization of purchasing power in the new war industries board probably is of significance.

Pig Iron is Waiting

While the hesitancy among pig iron buyers is being dispelled slowly, the fundamental strength of the market has been brought out by the insistent manner in which consumers are urging shipments. Monthly quotas are being followed up with great exactness and frequently anticipations are attempted. One or two districts have displayed a moderate enlargement in the volume of buying and new inquiry, but viewed broadly, a waiting market among buyers and consumers remains. Easier prices have continued to appear sporadically. The week's developments, following several resale transactions at concessions previously reported, have established the bessemer market at not over $55, valley, and lower is reported available. Softer prices in basic are indicated in Pittsburgh and valley territory, but no sales have resulted. Middlewestern makers who last week voluntarily adopted $55, furnace, as their maximum on foundry, malleable and basic, have given their action a true market significance by the acceptance of considerable tonnage on this basis. The government has closed the purchase of a round tonnage of iron for its own requirements at concessions.

Shipyards Lead in Month's Buying

Denman-Goethals Row Temporarily Slows Work on New Bottoms But Machinery is Purchased Lavishly for Future Production—Munition Makers Take Many Tools—Exports Revive Sharply

THE effect of the government's vast preparations for war continues to be reflected in practically every branch of the machine tool trade. Although considerable business has been transacted during the past month, the machinery trade still may be characterized as being on its toes ready for the starter's pistol. The inability of the government to come to a definite conclusion with regard to its shipbuilding program has been the chief deterring factor. The prolongation of the Denman-Goethals controversy throughout the greater part of July, resulting in the final change of the personnel of the shipping board, has held a huge amount of business in abeyance.

Even at this time the complete program of the new shipping board has not been made public, and little is known other than the fact that action will be taken for the speedy construction of ships, regardless of type. It is understood that 15 contracts for wooden and steel vessels have been completed, and are awaiting the approval of Admiral Capps, the newly-appointed manager of the Emergency Fleet Corp.

The position of machine tool builders generally, however, aside from the discomfiture occasioned by the delay in Washington, has been most satisfactory. The majority of manufacturers, especially those making heavy tools, are booked up on an average of six to eight months ahead, and it is known that some builders have orders calling for delivery as far off as a year. As a result grinders, milling machines, planers, cranes, punches and shearing machinery have been scarce. Punches and shears are almost unobtainable. The market on lathes, on the other hand, has been comparatively easy.

Foreign Buyers Place Large Orders

In the export business, France and Japan have been the largest buyers during the past month. Lathes, planers, shapers and milling machines have been in great demand by France, while a large assortment of tools also has been placed by Japan. Both of these countries still are in the market. Among the orders recently placed for export is one given by the Automobiles Berliet Co., of France, involving 17 cranes and various other equipment, and one placed by Japan calling for more than 80 lathes. F. G. Street, 60 Broadway, New York, is understood to still be in the market for a number of lathes, grinding machines, etc., for shipment abroad.

Among the shipbuilders to figure actively in the market in July was the Delta Shipbuilding Co., which revived a large inquiry for tools and cranes first issued several months ago. The Newport News Shipbuilding & Dry Dock Co. placed a large order for punching several months ago. The Newport News Shipbuilding & Dry Dock Co. placed a large order for punching and shearing machinery, and also a second order involving about 14 cranes. The Staten Island Shipbuilding Co. closed for a few cranes and still is in the market for a 20 and 75-ton machine. Several shipbuilding companies of importance were formed during July. One of the most recent of these is the Federal Shipbuilding Co., which was organized by interests affiliated with the United States Steel Corp. A plant costing about $6,000,000 has been started near Hackensack, N. J., and it is expected that the company will come into the market shortly for a large amount of machine tool equipment. Another shipbuilding undertaking to appear was that fostered by the American International Corp. It is reported to be planning construction of a yard to be completely equipped and in operation inside of four months. The Downey Shipbuilding Corp., 120 Broadway, New York, completed negotiations for the plant of Milliken Bros., Inc., on Staten island.

Many Inquiries Feature Market

Demand for munition makers during the past month has been characterized more by numerous small orders, involving one and two machines for replacement of old equipment, than by any very large contracts. However, there have been several large lists such as that of the T. H. Symington Co., whose total requirements probably will run up to $1,000,000, and the General Electric Co., which has purchased still further equipment for its plant at Schenectady, N. Y. Among other companies brought before the attention of the market last month, is the Steel Products Co., which has completed a seamless tube plant near Allenport, Pa., and is understood to contemplate buying a large list of tools. The Ashland Iron & Mining Co. has issued inquiries for a large number of cranes and open-hearth accessories. The Youngstown Sheet & Tube Co. has purchased four electric cranes, ranging in capacity up to 40 tons. The Edgewater Steel Co., Oakmont, Pa., has been installing equipment for the manufacture of car wheels and other railroad appliances. The National Tube Co. has been covering equipment for its benzol plant at Lorain, O. The General Motors Co., Detroit, has been negotiating for a heavy assortment of forge shop tools. The American Brake Shoe & Foundry Co., Erie, Pa., has entered the market for a number of tools, and the Erie Forge Co., of that city, also has inquiries out for a number of machines.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

MURRAY SHIPLEY, who recently resigned as vice president of the Lodge & Shipley Machine Tool Co., Cincinnati, joined forces with the late William Lodge in 1892, under the name which the company now bears. Mr. Shipley was born in Cincinnati in 1865, and received his primary education in the Chickering institute of that city. He then went to the Sheffield Scientific school, Yale university, from which he graduated in 1885. After engaging in the mercantile business for about a year, he was connected for two years with the Manley & Cooper Co., Philadelphia. Following his association with Manley & Cooper, Mr. Shipley became associated with Sechler & Co., manufacturers of vehicles, Cincinnati, and from this company he resigned to form the Lodge & Shipley Machine Tool Co. Mr. Shipley is first vice president of the National Metal Trades association and was until recently president of the Cincinnati branch of the same association.

Horace W. Robinson has accepted the position as manager of the Dallas, Tex., office of the Graton & Knight Mfg. Co., Worcester, Mass.

Charles H. Purdy has resigned as superintendent of the Dalton Machine Co., New York, and will engage in the designing and building of special machinery, with offices at 103 East 125th street, New York.

Juan Homs, trade commissioner for the department of commerce, recently returned from a mission in South Africa, Australia, and New Zealand, where he investigated the markets for agricultural machinery.

Harry E. Harris, president of the Harris Engineering Co., Bridgeport, Conn.; John H. Barr, consulting engineer, Remington Typewriter Co., New York, and William A. Viall, Brown & Sharpe Mfg. Co., Providence, R. I., have been appointed a committee to co-operate with the National Bureau of Standards in the making of gages for use in munitions plants. Mr. Barr has been appointed chairman of the committee.

G. Mattman, formerly foreign sales representative of the Cincinnati Milling Machine Co. and other Cincinnati manufacturers, and Thomas L. Bratten have bought out Mr. Willard and changed the name of the Willard Machine & Tool Co. to the Willard Machine Tool Co. G. Mattman is president and T. L. Bratten secretary and treasurer.

Captain de Guiche, a member of the French scientific commission, recently

MURRAY SHIPLEY

inspected the plant of the Browne & Sharpe Mfg. Co., Providence, R. I., and several machine tool plants in Hartford, Conn.

Perry L. Haynes, chief of tool design for the Locomobile Co. of America, resigned recently, having received a lieutenant's commission in the coast artillery corps of the Connecticut national guard.

B. M. W. Hanson, vice president and works manager of the Pratt & Whitney Co., Hartford, Conn., has resigned to become vice president and works manager of the Colt's Patent Fire Arms Mfg. Co., of the same city.

Frank R. Bacon, president of the Cutler-Hammer Mfg. Co., Milwaukee, has been called into federal service as captain of the quartermaster officers' reserve corps. Mr. Bacon left recently for Philadelphia to enter active service.

Alfred Spangenberg has resigned as assistant superintendent of the machine shop of the S. L. Moore & Sons Corp., Elizabeth, N. J., to accept a position as superintendent of the ordnance shop of the Mead-Morrison Mfg. Co., East Boston, Mass.

George N. Jeppson, works manager of the Norton Co., Worcester, Mass., has been appointed by Gov. Samuel W. McCall of Massachusetts a member of the official state committee to receive the Belgian commission when it visits Boston, Aug. 3 and 4.

Charles A. Paquet who recently resigned as president of the General Car & Machinery Works, Montmagny, Quebec, succeeds W. E. Patterson, formerly genral manager of that company, who has been relieved on account of ill health. D. O. Lesperance, a director of the company, has been elected president, effective immediately.

In the recruiting of the ninth engineers, national army, under command of Col. Herbert Deakyne, a superintendent of motive power, two master mechanics and one assistant master mechanic of the Pennsylvania railroad have accepted commissions. This regiment is composed entirely of railroad shopmen, who will go to France to work on repairs to the locomotives of the French railroads. H. H. Maxfield, superintendent of motive power, New Jersey division, Jersey City, N. J., is lieutenant colonel of the regiment, while C. D. Barrett, master mechanic, Williamsport division, at Sunbury, Pa., and C. S. Gaskill, master mechanic, Baltimore division, Orangeville, Md., hold commissions as majors, and F. S. Robbins, assistant master mechanic, Pittsburgh division, Pittsburgh, is commissioned as a captain. These officers have been furloughed by the railroad, and to fill their places the following appointments have been made: F. G. Grimshaw, assistant engineer of electrical equipment, Philadelphia terminal division, has been promoted to superintendent of motive power, New Jersey division; R. G. Bennett, assistant engineer of motive power, central division, succeeds Mr. Barrett at Sunbury; G. H. Watkins, assistant engineer of motive power, western Pennsylvania division, succeeds Mr. Gaskill at Orangeville; and J. H. Thomas, assistant general foreman, Pitcairn shop, succeeds Mr. Robbins at Pittsburgh.

THE OPEN HEARTH

Three Years of War and Their Effect on Prices

THREE years of war have given a lift to iron and steel prices such as is comparable to no other period in history. Full appreciation of the remarkable rise in that period may be grasped only when the market quotations of Aug. 1, 1914, in principal products are measured against those which prevail today. This spread in pig iron has amounted to from approximately $37 to $41.50; in semifinished steel, from $75.75 to $81; in finished rolled steel, from $10 in steel rails to $188 in plates and to approximately $200 in tin plates; and in old material from about $19 to $36.25 per ton.

These advances show that practically all products have been increased in value manyfold. The gross rise has been fairly uniform in different grades of pig iron, semifinished steel and old materials. In pig iron advances have amounted to practically 250 to 345 per cent; in billets and sheet bars about 525 per cent; in wire rods about 400 per cent; and in heavy melting steel about 210 to 235 per cent. In finished material, however, wide irregularities have been displayed. Here the three years' charges range from $10 per ton or 33-1/3 per cent in rails, a practically closed market, to 800 per cent in steel plates. Wire products have gone up $49, while wire rods have ascended $75.25. Other important advances are 630 per cent in No. 10 blue annealed sheets; 500 per cent in No. 28 black; 260 per cent in No. 28 galvanized; 400 per cent in structural shapes; 430 per cent in steel and iron bars; about 400 per cent in tin plate and about 260 per cent in wire nails. The rise in furnace coke has amounted to about 450 per cent. Spot coke at its recent high point, however, was about 840 per cent above the Aug. 1, 1914, price.

Studying the price evolutions of the past three years, the large part of the advance that has taken

WAR'S ADVANCE IN IRON AND STEEL IS UNPARALLELED

	Today's Price	August 1, 1914	August 1, 1915	August 1, 1916
PIG IRON				
Bessemer, Pittsburgh	$ 56.95	$14.90	$15.20	$ 21.95
Basic, Pittsburgh	53.95	13.90	14.45	18.95
Basic, Eastern Pennsylvania	51.00	14.00	14.25	19.00
No. 2 Northern, Chicago	55.00	14.00	13.25	19.00
No. 2X, Philadelphia	54.00	14.60	14.50	20.00
No. 2X, Virginia	52.00	12.50	12.50	18.50
No. 2, Birmingham	47.00	13.50	10.50	14.00
Malleable, Buffalo	55.00	13.00	13.00	18.75
Ferromanganese	400.00	38.00	98.00	170.00
COKE				
Furnace Coke, Connellsville, Contract	10.00	1.85	1.75	2.40
Foundry Coke, Connellsville	12.50	2.40	2.25	3.15
SEMIFINISHED				
Bessemer Billets, Pittsburgh	100.00	19.00	22.00	43.00
Open-hearth Billets, Pittsburgh	100.00	19.00	24.00	43.00
Bessemer Sheet Bars, Pittsburgh	105.00	20.00	21.70	43.00
Open-hearth Sheet Bars, Pittsburgh	105.00	20.00	25.00	43.00
Wire Rods, Pittsburgh	100.00	24.75	26.00	60.00
FINISHED MATERIAL				
Tank Plates, Pittsburgh	9.00c	1.10c	1.30c	2.90c
Tank Plates, Philadelphia	10.159c	1.25c	1.359c	3.909c
Structural Shapes, Pittsburgh	4.50c	1.15c	1.30c	2.50c
Steel Bars, Pittsburgh	4.909c	1.15c	1.30c	2.60c
Iron Bars, Chicago	4.50c	1.05c	1.20c	2.35c
Tin Plate, Pittsburgh, per box	$13.00	$ 3.25	$ 3.15	$ 6.00
Sheets, No. 28 Black, Pittsburgh	9.00c	1.80c	1.75c	2.95c
Sheets, No. 28 Galvanized, Pittsburgh	10.25c	2.75c	4.25c	4.30c
Sheets, No. 10 Blue Annealed, Pittsburgh	8.50c	1.35c	1.35c	3.00c
Wire Nails, Pittsburgh	4.00c	1.55c	1.60c	2.50c
Open-hearth Steel Rails, mill	$40.00	$30.00	$30.00	$35.00
OLD MATERIAL				
Heavy Melting Steel, Pittsburgh	36.00	11.50	12.00	16.00
Heavy Melting Steel, Eastern Pennsylvania	35.00	10.50	12.50	15.00
Heavy Melting Steel, Chicago	33.50	9.50	11.50	14.25
No. 1 Railroad Wrought, Eastern Pennsylvania	48.75	12.00	13.50	19.75
No. 1 Railroad Wrought, Chicago	36.75	9.00	9.00	14.50
No. 1 Heavy Cast, Eastern Pennsylvania	35.00	12.25	12.50	16.25
No 1 Cast, Chicago (net ton)	28.50	9.75	9.25	12.25

THE OPEN HEARTH

place during the past year is striking. It is set forth that fully two-thirds of the total uplift of the market since Aug. 1, 1914, came during the past 12 months. Apparently the cumulative effect of the previous heavy buying then expressed itself. This appears to hold true with substantial uniformity in practically all products. There is, perhaps, some relation between this fact and the general shortage in ingot capacity which made all products similarly scarce.

In 1914 the iron and steel industry produced approximately 23,300,000 tons of pig iron and 18,370,000 tons of finished steel. Prices then were the lowest in several years. Today with the highest prices by a wide margin ever known, production is running at the rate of about 38,300,000 tons of pig iron, about 45,000,000 tons of ingots, and perhaps 33,000,000 tons of finished steel. The extraordinary expansion of the total monetary turnover is illustrated by this comparison. The tremendous additions to credit accommodation and the general hazard in doing business today also are emphasized. At present it is necessary to extend to individual customers a line of credit far beyond that prescribed by good business standards in ordinary times. Without this, however, these buyers would not be able to conduct full operations since it requires a very much greater outlay to purchase a normal quantity of raw material.

Has the crest of prices now been reached? If supply and demand are left to themselves, the answer probably will be in the negative. Demand continues apparently much in excess of supply. The government or rather its attitude toward the market, however, now represents the principal price factor, sentimental or actual. A condition radically different from anything during the past three years now exists and this must be taken into full account in gaging the future of the market.

A Step in the Right Direction

FOR years certain American manufacturers have guarded processes and shop methods with the utmost jealousy. Short cuts to greater production, cost reducing practices and labor-saving machinery have been hidden within the four walls of the plant where only trusted employes were admitted. This practice has done much to hinder the growth of some of our greatest industries. Little, if anything, is gained in the long run by such methods. "Shop secrets" can be found out if sufficient time and effort are expended and the time lost while such secrets are being ferreted out might far better be applied in other directions. A notable and commendable attitude has been taken by practically every large machine tool builder in the United States since the declaration of war. Companies which have fought each other competitively for years, have exchanged information freely; the long-time trade feuds which have existed between builders of like equipment have been forgotten, perhaps for all time. The seriousness of the problems now before the nation has been realized by American tool builders and every effort is being put forward to co-operate with the federal authorities. Greater co-operation between tool builders means greater results for the government and is a step in the light.

An Opportunity for Great Service

THE selection of Edward N. Hurley as chairman of the shipping board wins the country's approval—an approval that the President's original choice of Mr. Denman never secured. Without condoning the vexatious and serious delays which the Goethals-Denman imbroglio imposed on the necessary plans to build ships at the greatest possible speed, the opportunity thus afforded of strengthening the shipping board may prove to offset the evils of the delay.

The shipping board is charged with some of the most important functions held by any governmental agency. Upon the decisions of this board rest largely the future of the American merchant marine, and the President's original selections proved disappointing to many of those who saw in the board an agency for a great purpose.

Politics were freely associated with Mr. Denman's choice as chairman. The congressional stipulation in the law authorizing the board was that the members should be appointed with regard to fitness for their duties and to a fair representation of the geographical divisions of the country. The Atlantic coast had two members on the original board, the gulf and Pacific coasts one each, and the fifth was from Kansas City. The Great Lakes were not represented. The resignation of Bernard M. Baker paved the way for the appointment which added little to the practical experience or combined capability of the board.

The board before the settlement of the Goethals-Denman row comprised one shipping man, a farmer, a lawyer, a lumberman and a railroad man. The resignations of Denman, Mr. White and Mr. Brent left the shipping man and the farmer. Mr. Colby, a new appointee, is a lawyer whose fitness for his post remains to be determined. Mr. Hurley is a former shipbuilder. His work on the federal trade commission has shown him to have the comprehensive grasp of big executive problems that the head of the shipping board must possess if that agency is to play its part in building up our merchant marine. The selection of Mr. Brent's successor should be made with a full recognition of the importance of that work.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 266

PIG IRON

(Delivery this year.)

Bessemer valley	$55.00
Bessemer, Pittsburgh	55.95
Basic, Pittsburgh	53.95 to 54.95
Basic, eastern Pa.	50.00 to 52.00
Basic, Buffalo	54.00 to 55.00
Malleable, Pittsburgh	55.95
Malleable foundry, Chicago.	55.00
Malleable foundry, Phila.	56.00 to 58.00
Malleable foundry, Buffalo.	54.00 to 55.00
No. 1X, Phila.	55.50 to 57.50
No. 2 foundry, Pittsburgh.	55.95
No. 2 foundry, Cleveland.	55.00
No. 2 foundry, Ironton.	55.00
No. 1 foundry, Chicago.	56.00
No. 2 foundry, Chicago.	55.00
No. 2X foundry, Phila.	53.00 to 55.00
No. 2X foundry, N. J. tide.	53.00 to 55.00
No. 2X foundry, Buffalo.	53.00 to 55.00
No. 2 plain, Philadelphia.	52.50 to 54.50
No. 2 plain, N. J. tide.	52.50 to 54.50
No. 2 plain, Buffalo.	52.00 to 54.00
No. 2 southern, Birmingham.	46.00 to 48.00
No. 2 southern, Cincinnati.	48.90 to 50.90
No. 2 southern, Chicago.	50.00 to 54.00
No. 2 southern, Phila. del.	53.00 to 54.00
No. 2 southern, Cleveland.	50.00 to 52.00
No. 2 southern, N. Y.	52.75 to 53.75
No. 2 southern, Boston.	53.50 to 54.50
No. 2 south. interior, N. E.	54.00 to 55.00
No. 2 southern, St. Louis.	49.40 to 51.40
Virginia, No. 2X, furnace.	52.00 to 53.00
Virginia, No. 2X, Phila.	54.75 to 55.75
Virginia, No. 2X, Jersey City	55.00 to 56.00
Virginia, No. 2X, Boston.	55.25 to 56.25
Gray forge, eastern Pa.	50.00
Gray forge, Pittsburgh.	52.95 to 53.95
Gray forge, Birmingham.	46.50 to 47.50
Silveries, 8 per cent, furnace	80.00 to 85.00
Silveries, 8 per cent, Chicago	85.00 to 92.50
Low phos. standard, Phila.	92.00 to 93.00
Low phos. Lebanon furnace.	83.00 to 85.00
Low phos., Pittsburgh.	82.00 to 85.00
Charcoal, Superior, Chicago.	59.50 to 62.00
Charcoal, Superior, Buffalo.	55.00 to 60.00
Charcoal, Birmingham	55.00 to 60.00

COKE

(At the ovens.)

Connellsville furnace	$10.00 to 11.00
Connellsville furnace, contract	10.00
Connellsville foundry, contract	12.50
Connellsville foundry	12.50 to 14.00
Wise county furnace, contract	10.00 to 11.00
Wise county foundry, contract	11.50 to 12.00
Pocahontas furnace, contract.	10.50 to 11.00
New River foundry, contract.	11.00 to 12.00
New River furnace, contract.	8.50 to 10.00

FERRO ALLOYS

Ferromanganese, prompt	$401.00 to 415.00
Ferromanganese, last half.	375.00 to 400.00
Spiegeleisen, 20 per cent furnace remainder of year.	80.00 to 82.50
Ferrosilicon, 50 per cent, Pitts.	225.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	130.00
Bessemer ferrosilicon, 9 per cent.	$94.00
Bessemer ferrosilicon, 10 per cent.	95.00
Bessemer ferrosilicon, 11 per cent.	97.50
Bessemer ferrosilicon, 12 per cent.	100.00
Bessemer ferrosilicon, 13 per cent.	105.00

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O., furnaces.

SEMI-FINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh.	$100.00 to 105.00
Open hearth, Philadelphia.	100.00 to 110.00
Open hearth, Youngstown.	100.00 to 105.00
Bessemer, Pittsburgh	100.00 to 105.00
Bessemer, Youngstown	100.00 to 105.00
Forging, Pittsburgh	125.00 to 135.00
Forging, Philadelphia	125.00 to 140.00
Forging, Chicago	100.00

SHEET BARS

Open hearth, Pittsburgh.	$105.00 to 110.00
Open hearth, Youngstown.	105.00 to 110.00
Open hearth, Cleveland.	110.00
Bessemer, Pittsburgh	105.00 to 110.00
Bessemer, Youngstown	105.00 to 110.00

WIRE RODS, MUCK BAR, SKELP

Wire rods, Pittsburgh	$95.00 to 105.00
Muck bar, Pittsburgh	85.00 to 90.00
Grooved skelp, Pitts., nom.	4.00c to 4.50c
Sheared skelp, Pitts., nom.	4.50c to 5.00c

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	4.50c to 6.00c
Structural shapes, Phila.	4.659c to 5.159c
Structural shapes, N. Y.	4.669c to 5.169c
Structural shapes, Chicago.	4.94c to 6.19c
Tank plates, Chicago.	10.19c
Tank plates, Pittsburgh.	9.00c to 10.00c
Bars, soft steel, Pittsburgh.	4.00c to 5.00c
Tank plates, Philadelphia.	9.159c to 10.159c
Tank plates, New York.	9.169c to 10.169c
Bars, soft steel, Chicago.	4.50c
Bars, soft steel, New York	4.669c to 4.919c
Bars, soft steel, Phila.	4.659c to 4.909c
Cotton ties, Pitts., Aug.	$2.12
Bar iron, Chicago.	4.50c to 5.00c
Bar iron, Philadelphia.	4.909c
Bar Iron, Cleveland.	4.50c to 5.00c
Bar iron, New York.	4.919c
Bar iron, Pittsburgh.	5.25c
Hard steel bars, Chicago.	4.25c to 4.50c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base.	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	65.00 to 70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill.	38.00 to 40.00
Relayers, light, Chicago.	60.00
Relaying rails, light, St. L.	57.00 to 59.00
Spikes, railroad, Pittsburgh.	5.00c to 5.25c
Spikes, railroad, Chicago.	4.25c to 5.25c
Track bolts, Pittsburgh.	5.50c to 8.00c
Track bolts, Chicago.	5.25c to 6.50c
Tie plates, Chicago.	$70.00 to 75.00

WIRE PRODUCTS

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh.	$4.00
Coated nails, Pittsburgh.	4.00
Plain wire, Pittsburgh.	3.95
Galvanized wire, Pittsburgh.	4.65
Polished staples, Pittsburgh.	4.15
Galvanized staples, Pittsburgh.	4.85
Barb wire, painted, Pittsburgh.	4.15
Barb wire, galvanized, Pitts.	4.85
Cut nails, Pittsburgh.	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts.	7.50c
Sheet piling, base, Pittsburgh	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 9.00c to 9.50c.

Market Report Index

	Page
Weekly Market Review	213
Pig Iron	219
Ferro-Alloys	221
Warehouse	221
Semi-Finished Steel	222
Coke	222
Bars	223
Tin Plate	223
Nuts, Bolts and Rivets	223
Sheets	224
Plates	224
Structural Shapes	225
Wire	225
Scrap	226
Rails, Cars, and Track Materials	227
Merchant and Cast Pipe	227
Non-Ferrous Markets	228
Coke By-Products	253
Machine Tools	254

SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	9.00c to 9.50c
No. 28, bessemer, Pitts.	9.00c to 9.50c
No. 28, open hearth, Chic.	9.69c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	9.00c to 9.50c
No. 28, bessemer, Pitts.	9.00c to 9.50c

GALVANIZED

No. 28, open hearth, Pitts.	10.25c to 11.50c
No. 28, bessemer, Pitts.	10.25c to 11.50c
No. 28, open hearth, Chic.	11.19c

BLUE ANNEALED

No. 10, open hearth, Pitts.	8.50c to 9.00c
No. 10, bessemer, Pitts.	8.50c to 9.00c
No. 10, open hearth, Chic.	9.69c
No. 10, open hearth, Phila.	8.659c to 8.909c

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base, nom. $10.00 to 15.00

IRON AND STEEL PIPE

(Prices adopted June 18, 1917.)

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 3, butt.	42	28½

Iron.

(Prices adopted June 30, 1917.)

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 1½, butt.	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	68.50
Six-inch and over, Chicago.	65.50
Four-inch, New York.	68.50
Six-inch and over, New York	65.50
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	6.00c to 6.50c
Bands, Pittsburgh	6.00c to 6.50c
Shafting, Pittsburgh, carloads	5 off to list

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh.	5.35c
Tinner's rivets, Pittsburgh.	30 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter.)

Rolled thread	30
Cut thread	25
Larger or longer	15

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	35
Cut thread	30
Larger and longer	20
Cold pressed, semi-finished, hexagon nuts	50
Gimlet and cone point lag bolts.	40

NUTS

Hot pressed, square, blank.	$1.80 off
Hot pressed, square, tapped.	1.60 off
Cold pressed, square, blank.	1.15 off
Cold pressed, square, tapped.	.90 off
Hot pressed, hexagon, blank.	1.60 off
Hot pressed, hexagon, tapped.	1.40 off
Cold pressed, hexagon, blank.	1.15 off
Cold pressed, hexagon, tapped.	.90 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products August 1, average for July, 1917, average for May, 1917, and average for August, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Aug. 1, 1917.	Average prices July, 1917.	May, 1917.	July, 1916.
Bessemer pig iron, Pittsburgh..	$55.95	$57.95	$44.95	$21.95
Basic pig iron, Pittsburgh.....	53.95	53.20	42.15	18.95
No. 2 Foundry pig iron, Pitts..	55.95	55.95	43.55	19.45
No. 2 Foundry pig iron, Chic...	55.00	55.00	43.20	19.00
Lake Superior Charcoal, Chicago	59.50	59.50	49.25	19.75
Malleable, Chicago	55.00	55.00	43.20	19.50
Southern No. 2, Birmingham...	47.00	46.00	35.75	13.75
Southern Ohio No. 2, Ironton..	55.00	54.25	38.60	18.50
Basic, eastern Pa.....	51.00	50.75	40.75	19.25
No. 2X Virginia, furnace.....	52.50	52.25	41.00	18.50
No. 2X foundry, Philadelphia..	54.00	54.25	43.25	19.85
Ferro mang., delivered.....	400.00	430.00	425.00	170.00*
Bessemer billets, Pittsburgh....	100.00	100.00	85.00	43.50
Bessemer sheet bars, Pittsburgh	100.00	105.00	88.00	43.50
Open hearth sheet bars, Pitts..	105.00	105.00	88.00	43.50
Open hearth billets, Pittsburgh.	105.00	100.00	85.00	43.50
Steel bars, Pittsburgh.....	4.00	3.85	3.50	2.50
Steel bars, Chicago.....	4.50	4.50	3.49	2.79
Iron bars, Philadelphia.....	4.909	4.759	4.159	2.559
Iron bars, Cleveland, local del'y	5.00	4.50	3.25	2.40

*Seaboard.

	Prices Aug. 1, 1917.	Average prices July, 1917.	May, 1917.	July, 1916.
Iron bars, Chicago mill.....	$4.50	$4.50	$3.39	$2.35
Beams, Chicago	6.19	4.94	4.34	2.79
Beams, Pittsburgh contract.....	4.50	4.50	4.50	2.50
Beams, Philadelphia	4.909	4.909	4.659	2.699
Tank plates, Pittsburgh.....	9.00	5.65	4.50	2.90
Tank plates, Chicago.....	10.19	9.64	5.49	3.19
Tank plates, Philadelphia.....	10.159	10.159	8.159	3.909
Sheets, blk., No. 28, Pittsburgh	9.00	9.00	7.00	2.90
Sheets, blue anld., No. 10, Pitts.	8.50	8.50	6.65	3.00
Sheets, galv., No. 28, Pittsburgh	10.25	10.25	8.85	4.40
Wire nails, Pittsburgh.....	4.00	4.00	3.50	2.50
Connellsville fur. coke, contract.	10.00	9.65	8.00	2.45
Connellsville fdy. coke, contract.	12.50	12.40	8.50	3.15
Heavy melting steel, Pittsburgh	35.00	40.25	28.40	16.25
Heavy melting steel, eastern Pa.	33.00	37.00	26.00	15.00
Heavy melting steel, Chicago...	33.50	35.50	28.75	15.00
No. 1 wrought, eastern Pa.....	48.75	54.00	42.00	20.00
No. 1 wrought, Chicago.....	36.75	39.25	32.50	15.50
Rerolling rails, Chicago.....	43.75	46.25	36.75	15.75
Car wheels, Chicago.....	35.50	36.75	27.25	12.90

(For Additional Prices See Page 266)

Prices Soften as Buying Hesitates

Bessemer Maximum Now More Clearly Defined at $55 Valley—Basic Shows Easier Tone—Malleable and Foundry Sell at $55 Furnace—Buyers Urge Shipments—Few More Active Spots

Pittsburgh, July 31.—With the pig iron market continuing to border on stagnation, it is not surprising to find anxious brokers and a few blast furnace managers offering moderate concessions in order to move tonnages. A southern Ohio furnace has been selling small lots of bessemer at less than $55, valley, and valley metal is reported to have been obtained at that price for nearby delivery. In fact, bessemer has been obtained at as low as $53, valley, although it is believed that the tonnage involved was disposed of by interests unable to obtain permits for export. Other grades have been disturbed by the possibilities of government control and regulation, although prices on basic, malleable and foundry grades show no important change. While it is likely that basic now may be bought at less than the recently prevailing price, no trace of purchases at less than $53, valley, can be found. Foundry and malleable irons are held at $55. Valley producers virtually have withdrawn from the market, preferring to await developments; they are not attempting to create any interest among buyers either for prompt or future delivery. Costs of pig iron have been increased substantially since July 1. Many blast furnaces are being supplied entirely with coke purchased in the spot market and furnace superintendents are beginning to draw upon iron ore purchased for delivery this year on the basis of $5.05 for Mesabi nonbessemer. No definite action has been taken by agents who entered the market some time ago for 50,000 tons of bessemer for Italy.

Salesmen are More Active

Philadelphia, July 30.—Sales of pig iron in this district during the past week have been unimportant. The disposition of consumers generally is to go slowly and to wait for a definite decision on the subject of government regulation of prices before making any new commitments. An interesting feature is that salesmen who have not been on the road much during the past year, again are beginning to make the usual calls in their territories. Prices on northern iron are well sustained and eastern Pennsylvania No. 2X is quoted at $53.50 to $55.50, Philadelphia. Sales of carload lots for spot shipment were made as high as $56, furnace. Prices on Virginia iron are strong and continue to incline upwards. No. 2X for this year now is held at $52.50 to $53, Virginia furnace; first half continues at $52.50, furnace. Small lots of spot malleable and bessemer have been sold around $56 to $58, Philadelphia. The only noticeable weakness of the week has been in southern No. 2, which was sold at less than $48, Birmingham, for prompt shipment. Another round tonnage of standard low phosphorus was sold during the week at $90, furnace. The only other development in low phosphorus was the appearance of a new inquiry for 2000 tons for Italy. The basic market here continues in a somnolent condition.

More Business in South

Birmingham, Ala., July 31.—Southern pig-iron makers sold a little iron during the past week and have received inquiries for a considerable tonnage, principally for export this year. It cannot be said, however, that the lull in the buying is at an end for there still is a big difference in the activity today and a month ago. Sales recorded the past week were on

a basis of $50 for No. 2 for this year and at $48 for next year. The Alabama Co., the Republic Iron & Steel Co. and the Sloss-Sheffield Steel & Iron Co. still are practically out of the market. They are selling only to regular customers and then in small lots. Other companies are not in position to dispose of much tonnage. Reports of concessions in the south have been verified to the extent that some tonnage was sold by one of the larger companies at $46, but there is no iron obtainable now at that price. But one or two furnaces in this section have opened books for the second half of 1918. There is a belief that prices have reached the crest. On the other hand, there is but little apprehension that government regulation will affect the market much. Stocks of iron have been reduced in this section until less than one month's production is on hand. Resale iron is heard of, but it has had little effect on the general market. Deliveries continue good. Apprehension is expressed by pig iron manufacturers as to the possibilities of a strike by coal miners and mine workers. There is but little surplus coal and coke to meet such an emergency.

Railroads to Expedite All War Shipments

PLANS for the solution of the difficult transportation problems thrust upon the railroads by the war have just been adopted by the railroads' war board after a series of conferences with representatives of the army, the navy and the United States shipping board. The problem concerns the supply and prompt movement of the thousands of cars required by the government to transport supplies to the shipbuilding yards, the army cantonments and other mobilization points. During the next few months, it is estimated that more than 100,000 cars will be needed for government purposes, held to be important.

Under the plans agreed upon the government will give advance notice to the war board's commission on car service whenever orders are placed for more than 10 carloads of materials or supplies. The government also will issue, when necessary, orders to the railroads, instructing them to provide the number of cars ordered within the time specified and at the shipping points designated. Railroads will forbid shippers the use of cars for any purpose except the loading specified in the government order.

A new form of envelope in which the waybills are to be carried has been designed and will be supplied to all persons or firms making shipments of materials for the use of the army, the navy, or the shipping board. These will bear the following headings, printed in big type: UNITED STATES GOVERNMENT, UNITED STATES ARMY SUPPLIES, UNITED STATES NAVY, UNITED STATES SHIPPING BOARD.

In addition, the railroads have been directed by the war board to instruct their agents at all points to stamp or write in a prominent place on waybills covering less-carload shipments consigned to officers or agents of the army or navy or of the shipping board, the words, "UNITED STATES FREIGHT, EXPEDITE".

Buyers are Indifferent

Cincinnati, July 30.—Some revival of the buying movement, signs of which have appeared in other districts, has not reached here. Buyers are even more indifferent and practically all of them are paying no attention to the market, as far as the future is concerned. Melters of foundry iron who have not covered for all of this year's requirements are buying small tonnages from time to time. So far as furnace iron is concerned, they are paying full market prices that now range from $48 to $50, Birmingham, for nearby shipment. A little resale iron has changed hands below the minimum figure, but the quantity is negligible. The inquiry was never lighter, and just now the majority of iron salesmen either are taking their vacation, or are devoting their time to tracing shipments for customers. Yard stocks are thinning out to some extent, as shipments are not moving forward as satisfactorily as could be desired, although the melt is heavier than at any previous midsummer season in the history of the business. Odd lots of Virginia foundry iron are still entering this territory, and as high as $53, at furnace, has been done for some spot No. 2X. At some points this would figure lower than $55, Ironton, which is minimum in that district. The furnace stocks in the Hanging Rock district are practically wiped out.

Shipments are Urged

Cleveland, July 31.—Uniformity of consumers in urging forward shipments of iron is in contrast with the indifference toward new buying which still prevails. All makers are being pounded hard for full shipments. Fears are expressed that the prevailing humid weather will have a curtailing effect upon production and may further impede the filling of demands. Several sellers report a moderate revival of new business during the week and have booked a fair tonnage in foundry and malleable, principally for next year, at $55, which continues the maximum price. These producers recently had made sales of these grades up to $58 to $60. Sales of the past week, while better, have been about one-third of those before the buying slackened. The July sales of one large producer total approximately 40,000 tons. Inquiry for foundry and malleable has been a little more active. Basic has shown no interest among buyers since the last sale at $53, valley.

Buffalo Sales Negligible

Buffalo, July 31.—The pig iron market continues very quiet, with only a small total of sales being made. Inquiries are at a low ebb, reflecting the waiting attitude of buyers. It is estimated that the placement in this district during the past week has not exceeded 1000 tons. Producers welcome the cessation of buying, as capacity is taken up for months ahead. The rather dubious question as to whether the furnaces will be able to make 100 per cent productions, and the uncertainties of the raw material situation are not conducive to great activity on the part of producers to make sales. Prices are unchanged. Such tonnage as has changed hands during the past seven days has been on the basis of $55 for average foundry grades and $57 to $58 for higher silicon grades.

Market Marks Time

St. Louis, July 31.—The pig iron market continues to mark time. Developments during the past week have been largely of a negative character. Actual transactions in spot or nearby delivery

were unusually light, and at prices slightly under recent high levels. The tendency is downward, and while consumption in this district is on an enormous scale, the big users are taking no chances on the future. Purchases are on a basis of actual requirements to cover business booked. No one is speculating, which is taken by best posted dealers to indicate that the pinnacle of the movement has been reached. Any adjustment in raw or finished products, it is thought, must be downward. Offers were heard of fairly large tonnages of No. 2 southern foundry iron at $48, furnace, for delivery inside of 60 days. For delivery over first half of 1918 liberal tonnages are offered at $45, and slightly lower. The sale of two cars was reported to an Illinois implement maker this week at $50, for immediate shipment. This sale, however, was for an urgent requirement, and hardly represents the market. Virtually all of the larger dealers are out of the market. They report inability to get iron delivered from the southern district, and are sold up for weeks ahead. Producers in the St. Louis district have been out of the market for a long while, and will have nothing to offer during the coming quarter. Resale iron has not been in sufficient volume to affect the general situation.

Alabama Offered Lower

New York, July 31.—Demand for pig iron in this district continues of smaller proportions than for many months past. With two or three exceptions, the only requirements on which consumers are now trying to cover are small tonnages for prompt or nearby shipment. A Newark, N. J., consumer has not yet acted on his inquiry for 500 to 1000 tons of No. 2X for shipment over the first half. This consumer has had eastern Pennsylvania iron offered to him for this delivery at $53, furnace. Eastern Pennsylvania iron for prompt and nearby shipment has sold around $54 to $55, furnace, although the outside figure more nearly represents the market. Southern iron, particularly southern warrant iron, is being offered at lower prices. Alabama No. 2 for first half has been offered in this district at a price equivalent to about $47, Birmingham. Alabama foundry for this year can be had from some sellers at an even lower figure. No sales of steelmaking or malleable have been made in this district for some time. Several export sales, involving principally foundry, have been made during the week, the export side of the market in fact being the most active temporarily. Numerous export inquiries continue under negotiation, as during the preceding week.

Spiegel Demand is Active

Substitution for Ferromanganese Apparently Stimulates Inquiry —6000 to 8000 Tons Current—Ferromanganese Steady

New York, July 31.—Recent efforts of the alloys committee of the American Iron and Steel Institute committee to encourage the use of spiegeleisen as a substitute for ferromanganese apparently is responsible for a greatly increased demand for this metal. Current inquiries involve 6000 to 8000 tons, mostly for delivery this year. The largest single inquiry is from the Whittaker-Glessner Co., Portsmouth, O., which wants 3000 to 4000 tons. Other requirements under negotiation include one inquiry for 1500 tons, another for 1000 tons, and numerous smaller lots. Actual sales during the week have been small but on the business done prices again show a slight upward trend. Sales of prompt carloads and a few small tonnages for this year have been done at $82.50 and in some cases sellers have asked $85. The market still is quoted, however, at $80 to $82.50, furnace.

Numerous sales of ferromanganese have been made during the week and probably several thousand tons changed hands. A fair sprinkling of inquiry is before the trade, including 1000 tons for a middle western consumer. Most of the business done was on the basis of $400, delivered east of the Mississippi river, for prompt and nearby shipment, $375 for last quarter and $350 for first half. The fact that shipments of English ferromanganese to this country are not expected to be as large in the future as in the past is likely to hold the domestic situation firm. A few sales of prompt carloads were made during the week above $400; in one case $425 was done.

Little activity is shown in 50 per cent ferrosilicon. Sales for this year continue to be made around $225, delivered; further round lots for first half have been closed at $130.

Ferrotungsten continues to show an upward tendency. One large block went to a domestic consumer at slightly higher than $2.50. The market may be quoted at $2.35 to $2.60 per pound.

All Alloys are Quiet

Pittsburgh, July 31.—Scarcely any new demand exists for ferroalloys and steelmaking metals. Consumers apparently do not want to incur additional obligations until they are more certain about the future. Prompt 80 per cent ferromanganese is being offered at $400, Pittsburgh, with reports of that figure being shaded frequently. Lower grades of bessemer ferrosilicon are being held on the basis of $95, furnace, for 10 per cent. Twenty per cent spiegeleisen is quoted at $80 to $85, furnace.

July Averages

In Bessemer and Basic Show Good Gain Over June

Pittsburgh, Aug. 1. (By wire.)—The average prices of bessemer and basic pig iron for July were $56.50 and $52.848, valley, respectively, according to compilations based upon sales of 1000 tons or more, announced today by W. P. Snyder & Co. Not much iron was involved in the month's turnover. Compared with the figures for the preceding month, bessemer in July advanced $3.234. In July, 1916, the average price of bessemer was $21, $25.50 below the average for the correpsonding period of 1917. The July basic average was $3.699 above that of June and $34.848 above that of July, 1916.

Government Buys

Material from Eastern Warehouses—General Demand is Active

New York, July 31.—Among the heaviest buyers of iron and steel out of warehouses in this district of late, has been the United States government, which has taken considerable tonnages of steel bars, plates, shapes, etc., for use at navy yards and other government establishments. Demand in general is as active as any time in past months. Included are the inquiries of structural shops, shipbuilders, railroad shops and all kinds of manufacturing and repair establishments.

Subway Contracts

Involving 25,000 Tons of Steel are Placed at Philadelphia

New York, Aug. 1. (By wire.)—After much delay, contracts have been awarded in Philadelphia for extensions to subway and elevated system. Four sections involving 15,000 tons have been let to the Keystone State Construction Co., one section to Edwin H. Vare, and another to Smith, Hauser & Macisaac. The total about 25,000 tons. No awards on the steel yet have been made.

Coke Sells at Wide Range

Furnaces Buying Spot Fuel Regularly Enjoy 50c Advantage —Consumers Stocking Up, Fearing Shortage

Pittsburgh, July 31.—Spot blast furnace coke is being sold at $10 to $11.25, ovens. Consumers buying all of their requirements in the spot market are enjoying prices about 50 cents a ton below those paid by blast furnace managers who are obtaining the bulk of their fuel through long-term contracts. Several days ago, 150 to 200 cars of coke were sold for shipment in August at $10, ovens. The contract market is at a complete standstill and it is not likely that additional contracts will be entered into until the market is more nearly normal. Spot foundry coke is commanding from $12.50 to $14, ovens. The car supply last week was 75 per cent to 80 per cent, compared with 100 per cent the week before. Yesterday, it was 100 per cent. The supply today is estimated at 60 per cent. Production is being affected considerably by the hot weather. Coke oven employes are refusing to work only part of the time, on account of the extreme heat. Production of Connellsville coke the week ending July 21 was 362,148 tons, compared with 349,519 tons the week before, according to *The Connellsville Courier*.

Spot Sales at $9.50

Philadelphia, July 30.—The coke market here continues to show a wide range and rosy tone. Spot furnace coke which sold Saturday at $9.50, Connellsville, now is sold at $10 to $10.50. Spot foundry coke prices range from $13 to $14, Connellsville, and it is understood some has been sold at less.

Can't Accumulate Supplies

Cincinnati, July 30.—Complaints are more frequent as to the slow shipment of both furnace and foundry coke on contract. The foundries are especially anxious to pile enough coke to guard against the future, but just now some of them are doing well to get ahead enough fuel for a week's supply. The present hot weather, it is feared, may make the situation worse, and this is causing some apprehension. Spot coke was easier the latter part of last week, but on account of the hot spell it is predicted that this condition may only be temporary. At its best, labor is an uncertain quantity in the coke fields. For prompt shipment Connellsville and Wise County furnace coke is quoted around $10.50 to $11.50, and a nominal price for contract would be $10 to $10.50. Prompt foundry coke is from $12.50 to $14.50 and contract from $12 to $13, ovens. New River and Wise County foundry coke contract prices range from $12.50 to $13.50, ovens.

Prepare to Store Supplies

St. Louis, July 28.—The slump in coke prices in the east has failed to materially affect the market here, especially for foundry coke. The demand for that grade is good. Furnace coke has declined to about $10, ovens. Consumption has been reduced in spots, but stocks are not burdensome. The persistent talk of probable coal and coke shortages in the middle west this winter, due to car conditions, labor, etc., is beginning to have decided effect on consumers. Many of them are making preparations to store supplies. Some are taking chances with present prices and conditions, rather than await cold weather developments. Railroads report 100 per cent car efficiency at ovens, but loading labor is considerably below that figure. The new result is the same as if cars were lacking. On the whole, however, there is little complaint on the score of deliveries, which are rarely under 60 per cent. Connellsville and Virginia 72-hour foundry coke is quoted at from $15.95 to $16.45 f. o. b. St. Louis.

Labor Situation Alarming

Birmingham, Ala., July 31.—Not only are the regular market prices of coke being maintained in the Birmingham district, but some car lots of foundry fuel were sold here in the last few days at $16, the highest figure yet shown. The producers of coke are not able to handle much business beyond contract deliveries, but now and then a car is sold at a fancy price. Coke producers are alarmed at the labor situation. The convention of the United Mine Workers of America, Alabama district No. 20, began Monday morning, and committees were named to formulate a wage scale and to arrange agreements between mine workers and the operators, looking to recognition of the union. A joint conference has been arranged for Aug. 2 in Birmingham, but operators say they will not attend. This may mean a strike order. A two weeks' cessation of operations at a few mines in this district is likely to cripple the coke, iron and steel industry for a time. There is but little surplus coal and coke in the district; in fact, one interest has announced only enough coal on hand to bank fires for a while at furnaces and coke ovens.

Semifinished Seems Easier

Believed Lower Prices May be Done—3650 Tons Wanted for Munitions—Italy Buys 10,000 Tons of Rods

Pittsburgh, July 31.—Quotations on semifinished steel products are unchanged, although it generally is believed that they will recede as soon as active buying is resumed. Billets and sheet bars under normal conditions sell at about 1-1/3 times the price of steelmaking pig iron, which today would mean about $75 to $80 per ton on billets and sheet bars. A local forging interest is negotiating for 2000 tons of blooms and 1650 tons of 3, 4, 5 and 6-inch round billets, the specifications for which indicate that the material is wanted for the manufacture of munitions. A local broker reports the sale of 1000 tons of sheet bars at $105, Pittsburgh. That figure has represented the bottom of the market for several weeks. Wire rods continue to be held at $95 and above. No sales of muck bar have been made recently.

Strip Steelmakers Mobilize

Pittsburgh, July 31.—Manufacturers of cold rolled strip steel are mobilizing their capacities to assist in carrying out the program for the construction of aeroplanes. Scattering orders already have been placed by aeroplane builders, all of whom are making arrangements for stock for future shipment. Strip steel continues to be listed at 9c to 9.50c.

More Steel is Offered

Philadelphia, July 30.—Semi-finished steel is being offered more plentifully in this district but all demand momentarily seems to have disappeared. Open-hearth rerolling billets have been offered at $105 to $110, but without finding any takers. Open-hearth shell discards have been offered at $60, without sales resulting.

Italy Buys Rod Tonnage

New York, July 31.—The semifinished steel market in this district has been featured mainly by activity in export business. Exporting sales include one lot of 10,000 tons of wire rods taken by the Italian government. A French consumer has taken 1200 tons of open-hearth wire rods at $95,

New York, and rerolling billets are more plentiful than for some time past and can be had at $105 to $110. Open-hearth forging billets continue scarce. A domestic consumer a few days ago took several hundred tons of the latter from an eastern maker at $140, which represents a new high figure.

Some Lots at $105

Youngstown, O., July 31.—Makers continue to shy at fourth quarter business for sheet bars. Small tonnages will be accepted in this quarter at $105, mill, provided they do not interfere with present rolling schedules.

No Fourth Quarter Sales

Cleveland, July 31.—No fourth quarter sheet bar business has as yet appeared in this territory and makers are not encouraging the opening of such trading. Present prices appear to be approximately $105 to $110 mill. A small sale of forging billets at $125, delivered, Cleveland, was made this week.

More Than $25

Offered for Tin Plate for Export—Tonnage for Allies

Pittsburgh, July 31.—The tin plate mill capacity of this country, it is gratifying to note, is sufficient to meet demands of packers in this country and large tonnages will be available for shipment to our allies. It is not likely that mill managers will be asked to operate plants on Sunday. People in close touch with the situation say the interests of the nation would be jeopardized if mill men were requested to work an additional turn each week. The government is calling upon tin plate makers for material for large containers of miscellaneous types. Export demand is heavy. Anxious buyers have offered to pay more than $25, base, for export. The domestic situation is quiet.

Gladly Pays $18

Youngstown, O., July 31.—Tin plate orders for export purposes in the Mahoning valley have been increasing the past month. One maker recently quoted $18 per base box to an Argentine buyer. This price gladly was acepted by the buyer in view of the fact that the excess cost of tin plate would be much less than the loss in meat if the material was not obtained. This sentiment is general among South American buyers.

The Perkasie Forge & Machine Co., Perkasie, Pa., a new corporation, has purchased a factory building and will manufacture steel forgings.

Auto Trade Holding Back

Bar Specifications Reduced and Some Tonnage for Extensions Cancelled by Supply Plants—Bar Iron Up

Pittsburgh, July 31.—Bar mills are being driven at capacity to meet the demands of the government. Huge quantities of material are entering the manufacture of shells and large quantities of reinforcing bars have been purchased by the government for fortifications, machine shops and cantonments. While details of shell orders are not announced, yet it is known that rolling mill superintendents frequently are working late into the night and on Sundays in order to rush work with the greatest possible dispatch. The domestic market is almost at a standstill. Agricultural implement makers are specifying briskly, but automobile manufacturers have reduced specifications materially. Bar iron has been advanced $5 a ton to 5.25c by leading makers in this district.

Nation Takes Shafting Output

Pittsburgh, July 31.—Fully 65 per cent of the output of steel shafting is entering the manufacture of munitions in one form or another. Some of the single lots placed in this territory total 5000 to 10,000 tons. Managers of plants in this district express the belief that their entire capacity will be devoted to the military requirements of the nation before the end of the year. Automobile manufacturers, in many instances, have withdrawn from the market, as previously indicated. Shafting is quoted at 5 per cent off the list to list price.

Extensions are Held Up

Cleveland, July 31.—Certain automobile supply companies which have been planning further extensions are holding up these improvements because of the shrunken volume of business in pleasure cars. In some cases cancellations or reductions of steel placed for these extensions principally reinforcing bars are being brought about. Akron rubber manufacturers are among those who have been so retrenching. One of the local mills which has been filling a bar order for France has been held up by the lack of vessels. Some preliminary orders for aeroplane steel continues to be placed and these are expected to be followed by larger quantities. The city of Columbus has divided 700 tons of reinforcing bars for Scioto river improvements between the Trussed Concrete Steel Co. and the Claycraft Builders' Supply Co.

Bar Iron Buoyant

Philadelphia, July 30.—Demand for bar iron continues fair and prices show a substantial upward tendency. Minimum on refined bar iron now is 4.75c, Pittsburgh, but in some cases as high as 5.50c is being obtained for small tonnages for quick shipment. On steel bars the market is dull. Sales of small tonnages for comparatively quick delivery have been made during the week at 5c, Pittsburgh. The minimum continues 4.50c, Pittsburgh. Prices on rivets have been advanced again. Boiler quality, ¾-inch and larger, have been raised from 5c to 5.35c base, Pittsburgh. Structural rivets are quoted at 4.90c.

No Bars for Sale

Chicago, July 30.—Conditions in the market for soft steel bars remain unchanged, with mills offering no material and consumers for the most part recognizing the situation and avoiding inquiry. Except for bars required in government work, practically nothing is being booked by steelmakers, and the market remains nominal. Hard steel bars continue on a basis of 4c to 4.50c, Chicago mill, with most sales at the maximum figure. All Chicago mills are comfortably filled, but with rerolling rails becoming cheaper, it will be easier to place future business. Practically no selling of bar iron is being done at present by Chicago mills. This condition is welcome to makers, as they have commitments as far into the future as they desire. Current demand is for material going into equipment for the government. Consumers who have contracts are asking anticipation of delivery. Contracts are being specified fully. Some demand recently has been received from the south. Quotations remain nominal at 4.50c to 5c, Chicago.

Rivetmakers are Swamped

Pittsburgh, July 31.—Demand for ship rivets is heavier than ever before in the history of the trade. Huge orders are being placed by the government and private shipbuilding interests are buying on a constantly increasing scale. Deliveries are more deferred. Several manufacturers virtually have withdrawn from the market. Premium prices are being paid for prompt shipment. Quotations on nuts and bolts have been advanced this month by nearly all makers, no two of which are asking the same quotations.

Cotton Tie Mills Busy

Pittsburgh, July 31.—Mills rolling cotton ties will not complete their

schedules until September, unless this year's cotton crop, now estimated at 12,000,000 bales, falls far below expectations. Plantation owners who did not cover their requirements in June, in August will pay $1.12 a bundle of 45 pounds, 2 cents a bundle above the price at which the market was opened two months ago and greatly higher than last year.

France Buys Plate Tonnage

Places 60,000 to 70,000 Tons Through Steel Committee—Heavy Shipments to Japan Held Up Awaiting License

New York, July 31.—Orders for 60,000 to 70,000 tons of plates have been distributed in this country by the French government. This business which was placed with the assistance of the committee of the American Iron and Steel Institute involved both tank plates and Lloyd's boiler plates. The price on the tank plates was 6c, Pittsburgh, and the boiler plates 9c. Aside from the French business current export demand for plates is coming principally from Japan. The government, however, has been holding back licenses for exporting steel to Japan. As a result most mills are abstaining from quoting on Japanese business for the time being at least. At the present time large tonnages, principally plates and shapes, for Japan, are being held up both at plants and seaboard terminals, due to inability to procure licenses. The belief prevails in the trade, however, eventually Japan will succeed in releasing the tonnage. Estimates are heard in the trade that the steel orders now on books for shipment to Japan involve approximately 450,000 tons, largely plates. The mills daily report that they are turning away from 5000 to 25,000 tons of plates and shapes for Japan.

Large new contracts for the fabrication of steel vessels for the government are expected to be placed soon. The Downey Shipbuilding Corporation will require about 35,000 tons of plates and shapes for the 10 government ships it is to build. The minimum price asked by eastern mills on tank plates for shipment at convenience still is 10c, Pittsburgh, or 10.169c, New York. Plates out of warehouse on the other hand are selling as low as 8c and 9c, New York.

Offer 1918 Contracts

Philadelphia, July 30.—Eastern Pennsylvania plate makers continue to receive from the committee of the American Iron and Steel Institute large allottments of plate tonnages for the government. This business, which is given first place on mill schedules, is of such proportions as to force the mills to turn away a large amount of their regular tonnage which they otherwise would be in a position to take. Requests for quotations and deliveries show no falling off. Some consumers already are trying urgently to close for their 1918 requirements, but the mills, not knowing what the war situation will be demanding of them by that time, cannot accept this tonnage. Several lots of tank plates have been offered at 11c, base, Pittsburgh, for shipment at the mills' convenience, and declined. The market appears to be strong at 10.159c base, Philadelphia, as minimum on tank plates. No sales of boat plates are reported.

Want Protection Against Decline

Pittsburgh, July 31.—Many consumers of plates and other products have attempted to buy material for the fourth quarter of this year and the first quarter of 1918 under contracts which protect them against price decline. So far as can be learned, manufacturers have refused absolutely to consider such contracts, prospective purchasers being told to pay prevailing quotations, if material actually is wanted. Moreover, it more generally is believed that the government will not attempt to regulate prices to domestic consumers. Approximately 100,000 tons of ship plates a month are being rolled in this district at present; it is likely that the mills will furnish 150,000 tons a month before the end of the year. Specifications for plates and shapes have fallen off. Tank and car builders virtually have withdrawn from the market. It is understood that considerable surplus stock is accumulating at eastern shipyards. Heavy demand exists for export, but mills are refusing to sell unless prospective buyers are able to produce shipping permits. For foreign shipment, plates are commanding 11c; the domestic market is quoted at 9c to 10c.

Government Ship Plates

Cleveland, July 31.—An order for about 3000 tons of ship plates for government vessels was placed with a local maker this week. Other tonnage constantly is being taken indirectly by manufacturers of war supplies. Cleveland mills have been taking on some additional export tonnage and of an inquiry for 5000 tons, 3000 tons were distributed this week among two makers at 10.50c, mill. Another export lot of 500 tons went at the same figure. These plates are for early shipment. On 400 tons of boiler steel for export for next year 14c, Cleveland mill, was paid. Cleveland makers, as a rule, now quote 10c, mill, although some sales to regular customers have been made lower. A little warehouse tonnage in plates still is obtainable at 8c.

Government Taking All

Chicago, July 31.—It is the experience of some makers of steel plates that government requirements are being placed in much larger volume than had been expected and such promptness in delivery is being demanded that almost nothing is being shipped to other consumers. This is causing some inconvenience to steel-plate users and an example is cited of a tankmaker who recently received one carload of plates in a period of three weeks, when his ordinary weekly receipts total at least 250 tons. It is practically impossible to reach a quotation under the present circumstances. A new government order to the leading maker here calls for 6000 tons of ship plates to go to a San Francisco yard.

More War Sheets Closed

Orders Placed by Government to Date Estimated at 100,000 to 125,000 Tons—Navy Wants 5000 Tons

Pittsburgh, July 31.—The sub-committee on sheets of the American Iron and Steel Institute has called upon manufacturers for about twice as much tonnage as expected. To date, makers have received orders for from 100,000 to 125,000 tons for miscellaneous purposes. Inquiries are pending for 5000 tons for the navy. Now that the shipping board controversy has been ended, it is likely that large quantities of sheets will be purchased for ships. Sheet mills are operating at maximum capacity, although the hot weather is beginning to have an adverse effect upon rolling mill employes. The domestic market is quiet. Some inquiry exists for extended delivery, but mill managers are refusing to sell for future shipment, except

at prevailing quotations. Prices show practically no change.

Steel for Submarine Chasers

Philadelphia, July 30.—Practically the only business being placed in the sheet market in this district comprises tonnage for government requirements. A Pennsylvania manufacturer who has a contract to make tanks for submarine chasers, placed a material tonnage. Several fair sized additional tonnages have been distributed by the sub-committee on sheets. As far as known, all the sheets now being placed by regular consumers in this district are coming out of warehouses, since the mills, especially in view of government orders, are so booked they can take on no more regular tonnage. The volume of inquiry has decreased materially during the past two or three weeks. The market on No. 10 gage, blue annealed, continues nominally at 8.50 to 8.75c, Pittsburgh.

Inquire for Sheets

Youngstown, July 31.—Inquiries for sheets from private buyers to Mahoning valley makers have increased considerably this week. Buyers gradually are coming out of their seclusion and seeking quotations more freely. One maker has completed a 5000-ton allotment for the government to be used for stoves, etc. The market remains steady. One maker is quoting galvanized, No. 28, at 10.50c as a minimum and 11.50c high. Blue annealed, No. 10, commands 8.50c to 9c, and black sheets, No. 28, from 9c to 9.50c.

Many More Nails

For Cantonments and Other Government Work are Distributed

New York, July 31.—Orders have been distributed by the sub-committee on wire products for the nail requirements of the 16 cantonments. The requirements were 800 to 1200 kegs for each encampment, making a total of approximately 16,000 kegs. This business was distributed among light leading makers. During the past two or three days additional orders have been distributed among these makers for approximately 4000 kegs for the aviation camps at San Antonio, Tex. The requirements for the 16 cantonments now under construction are not as much as it was first estimated. It now is expected that each cantonment complete will require about 4000 to 5000 kegs, making a total of 70,000 to 75,000 kegs. Orders for these nails were distributed among the eight leading makers.

The navy department has inquired for about 2000 kegs of nails for buildings at the Norfolk navy yard and these are to be distributed without delay.

Government Buys More Nails

Pittsburgh, July 31.—The sub-committee on wire of the American Iron and Steel institute has distributed orders for 25,000 kegs of wire nails for cantonments. The American Steel & Wire Co., it is understood, will furnish about 50 per cent of the tonnage involved, purchased at $3.20 a keg. Several weeks ago, orders for 50,000 kegs were distributed by the Institute committee. Independent manufacturers continue to quote nails at $4 a keg, $16 a ton above the price of the leading interest. Jobbers not supplied by the American company are complaining about the $4 price, claiming they are unable to compete against buyers who are obtaining nails on the basis of $3.20 a keg. The domestic market is exceedingly quiet.

Orders Armor Plant Ahead

Government Decides to Take Construction Bids Involving 25,000 Tons of Steel—War Shape Needs Get Precedence

New York, July 31.—The government has decided to go ahead with the construction of its armor plate plant at Charleston, W. Va., according to definite word from Washington today. The structural steel fabricators expect that the plans for the buildings will be in their hands by Aug. 15. It is estimated about 25,000 tons of steel will be required. Work shortly is to be commenced on the construction of the projectile plant at Charleston, W. Va., Warren Moore & Co., Philadelphia, have been advised that they are low bidders on the general contract. In case this bidder gets the contract, it is expected that the steel, 4500 tons, will go to the American Bridge Co. Structural steel lettings in metropolitan territory are in diminishing volume. Practically the only demand is for small tonnages for miscellaneous purposes, and these are of an unimportant total. While industrial demand involves a fair tonnage, it is not as large as a few weeks ago. This situation is welcomed by the mills because of their sold-up condition. Furthermore, the large requirements for government work recently placed have been the right of way with the result that delivery of other tonnages is being moved back. Generally, therefore, mills bookings show little shrinkage.

Chicago Market Quiet

Chicago, July 30.—Little is being done in the shape market, although government demands are taking definite form. Recent lettings in the west involve only three projects, each for between 300 and 400 tons. The price situation is unchanged.

Tonnage for Airplane Plant

Buffalo, July 31.—Bids are being received for about 4000 tons of structural seteel for the new Curtiss Airplane & Motor Corporation factory for which ground was broken last week. The whole contract means about 1,000,000 square feet of floor space. The units started now are the metal-working shop and the woodworking shop, each of which are about 100,000 square feet in area. The Austin Co., of Cleveland, will build the plant. New business in this territory is very light, as buyers are hesitating until the government acts.

Shape Tonnage Wanted

Cleveland, July 31.—An inquiry for 4000 to 6000 tons of structural shapes for office construction has been put on the market by interests which are maturing a new building proposition in this territory. New business generally continues at minimum. A local buyer who is in the market for 1400 tons of shapes for motor truck frames, has decided not to buy. Shape prices are not clearly shown by reason of stagnant conditions, but 4.50c, Pittsburgh, remains the virtually nominal figure of leading independent makers.

CONTRACTS AWARDED

Fourth street viaduct at Kansas City, Mo., 358 tons, to American Bridge Co.

Morgan Park subway at Steelton, Minn., for Spirit Lake Transfer Railway Co., 347 tons, to American Bridge Co.

Benzol recovery plant, Steelton, Minn., for Minnesota Steel Co., 300 tons, to American Bridge Co.

Machine shop for Staten Island Shipbuilding Co., 500 tons, to American Bridge Co.

Bridges for Philadelphia & Reading Railroad, 160 tons to McClintic-Marshall Co.; 50 tons to American Bridge Co.

CONTRACTS PENDING

New plant for the Curtis Aeroplane & Motor Corp., Buffalo, 4000 tons. The Austin Co., Cleveland, awarded general contract.

Government armor plate plant, Charleston, W. Va., approximately 25,000 tons, specifications expected to be ready about Aug. 15.

Government projectile plant, Charleston, W. Va., 4500 tons, Warren Moore & Co., Philadelphia, low bidder on general contract; steel expected to go to American Bridge Co.

Bridges for Chesapeake & Ohio railroad, 175 tons, bids being taken.

Building for Red Cross at Washington, 200 tons, bids being taken.

Addition to car sheds of Interborough Rapid Transit Co., New York, 500 tons, bids being taken.

Bridges for Pennsylvania railroad, 630 tons, bids being taken.

Await End of Scrap Drop

Chicago Market Shows Better Signs—Brokers Resume Bidding for Material—General Declines However Still Prevail

Chicago, July 30.—Although iron and steel scrap products continue to seek somewhat lower price levels, the decline which has continued for some time seems to have reached almost its low point. Various signs indicate that quotations will not go much below the present level and that a reaction might be expected, which some observers believe may carry the market beyond the high point reached last spring. Brokers have resumed bidding on railroad offerings and consumers are taking somewhat more material than has been the case for several weeks. During the past week a number of items remained steady at former quotations, while declines of 50 cents to $3 per ton were made by others. Railroad offerings are small, the Chicago & Northwestern offering 3000 tons; the Chicago, Burlington & Quincy 5450 tons, and the Soo Line 475 tons.

Rejections are Numerous

Philadelphia, July 30.—Rejections of iron and steel scrap by eastern Pennsylvania consumers are becoming more numerous. This tendency especially is shown in city wrought, which offers the most opportunities for complaint. Some dealers say that practically every car of this grade they are shipping on old contracts now is being rejected. In most cases, adjustment is made by reducing the price, and, in some cases, by paying demurrage. Embargoes continue to interfere with shipments. One was declared on Reading this week, but that on Lebanon will be lifted soon. The only grades showing firmness are those for foundry consumption, for which there is a fair demand. Steel scrap is very quiet. One eastern Pennsylvania mill purchased about 2000 tons of steel at $32, delivered, and later wanted to buy more at $30, but failed. Prices during the week have declined as follows: Rerolling rails, $5; heavy melting steel, $2; steel shafting, $3; old car wheels, $3; cast borings, 75 cents; machine shop turnings, $2.75; frog switch and guard rails, $2.

Dealers More Hopeful

Pittsburgh, July 31.—Although quotations on iron and steel scrap continue to recede, dealers appear to be more hopeful about the future. They believe that a general buying movement will appear at an early date. Most prominent melters have not figured in the market for about a month, although it is known that they are using as much material as ever. Purchasing agents, almost without exception, summarily withdrew from the market, when heavy melting steel touched the $47 mark. Today, this grade freely is offered at $35. Specifications against contracts are heavy. Dealers, who sold short early in July, are said to have amply protected themselves.

General Decline Unchecked

Buffalo, July 31.—The scrap market exhibits about the same characteristics as were in evidence last week. No transactions of sizeable volume are being closed. Most grades show further decline, with heavy melting steel leading. This grade has dropped $1 and now is quoted at $33 to $34. Low phosphorus steel is off and the price is now $45 to $48; busheling No. 1 shows a decline of $2, and No. 2 a decline of $1; grate bars, a $2 decline; iron axles, a $5 decline. No. 1 railroad wrought is off $3; steel car axles, $5; iron car wheels, $2, and railroad malleable, $2. Prices have been further demoralized and the situation complicated by additional embargoes in the Pitsburgh and valley districts. Dealers are engaged principally in working up back orders. There has been a number of cancellations by consumers recently on high-priced orders by reason of the time of delivery having expired.

Offerings Exceed Demand

Cincinnati, July 30.—The receipts of scrap now exceed outbound shipments. Offerings also are far ahead of the demand, and as a consequence prices are growing weaker. Dealers are inclined to base the slack demand solely on the uncertainty of the government's proposed action in the regulation of prices. The consumption of all kinds of scrap is far ahead of any similar period. Cars are scarcer, but this is looked on as only a temporary condition, as compared with the first two weeks of the present month. The situation displays no signs pointing toward early improvement.

Cuba Wants Relayers

Cleveland, July 30.—The scrap market in this territory practically is at a standstill and no trading worth while is expected during August. A carload here and there for immediate or nearby delivery represents the extent of trading from day to day. An inquiry for 5000 tons of relaying rails for Cuba has appeared through the local chamber of commerce. Transportation conditions are comparatively easy. Quotations continue to droop. Hydraulic pressed sheets have been marked down $3 and are quoted at $28 to $29; short steel rails are $2.50 to $3 lower, to $38 and $39; railroad car wheels are off $1 or more and are listed at $31 to $32; No. 1 railroad wrought is $2.50 to $3 lower and is held at $41 to $42. Heavy melting steel is fairly firm at $32 to $33, but there is not enough trading to definitely establish the market.

Downward Movement Unhalted

St. Louis, July 30.—Prices for iron and steel scrap continue on the downward grade, and the market is duller just now than at any time since the big movement started. Principal users are not disposed to place orders at any price. This hesitancy is due entirely to uncertainty relative to prices on finished material which may be regulated by the government. Consumers, however, have been operating to capacity up until this time, and the July shut-down for repairs and overhauling has been eliminated wherever possible. With consumption of scrap at a record rate and continued light offerings of railroad material, brokers contend that the recent slump shortly will be recovered and higher prices probably reached. The only railroad offerings last week were Chicago, Burlington & Quincy, 2500 tons; Chicago & Eastern Illinois, 200 tons; Delaware & Hudson, 100 tons; Ann Arbor, 300 tons; Boston & Maine, 750 tons; Chicago & Belt, 200 tons and the Chicago & Western Illinois, 300 tons.

Southern Prices Still Drop

Birmingham, Ala., July 31.—Further weakness is apparent in iron and steel scrap in the Birmingham district and further reductions in quotations have been made. Shop turnings show a decline of $2, while tramcar wheels and car wheels are lower. Some of the dealers in Birmingham are paying demurrage on cars of old material rather than unload, hoping to dispose of the material soon. Consumers apparently are fairly well supplied and are not anxious to purchase save where they are offered concessions. All grades have shown weakness and consumers evidently can get material under the published quotations.

The Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich., has received a large government order for castings for airplanes and airplane motors, the latter to be of the 8 and 12-cylinder types.

Government Places Rails

Orders 150,000 Tons for Troop Lines in France—Domestic Roads Buying for 1918 and 1919 at $50

New York, July 31.—Orders for 150,000 tons of 80-pound bessemer rails for the construction of tracks behind the American front in France, have been distributed by the government with various makers through the general steel committee. In the allotment of these rails the Steel Corporation mills received about 90,000 tons and independent makers 60,000 tons. Orders shortly will be distributed also for 2,000,000 track bolts, 100,000 kegs of spikes and other accessories. In addition the government is in the market for 25,000 to 30,000 tons of light rails, track fastenings, etc., for the construction of portable tracks. This inquiry is exclusive of another for 30,000 to 35,000 tons of similar material which recently was put out by the French government.

Nothing definite has been announced regarding cars wanted for France by the government, but it is believed 10,000 will be wanted. As previously reported orders recently were placed for 300 locomotives.

Several orders for rails, involving 5000 to 10,000 each, recently have been placed by eastern roads for 1918 and 1919, delivery at $50, mill. It is considered likely that pending inquiries shortly will be closed around $50, mill. These inquiries now current from eastern roads involve several hundred thousand tons for 1919 delivery. In addition, numerous inquiries have come out recently which indicate that a comparatively heavy tonnage still is wanted for 1918 delivery.

Orders for railroad equipment placed in July aggregated 8400 freight cars, compared with 9000 in June and 16,500 in May. Of the July total, 1100 were for Canada, the remainder for domestic roads. Orders placed included about 4100 box cars, 1375 center constructions, 1520 hoppers, 1500 coke cars, 560 gondolas, and the remainder mostly flat and tank cars. Buying was quiet during the month, but owing to the situation in the markets for various materials, leading builders report they are getting further behind in deliveries. The government's plan to purchase about 100,000 cars for use in this country still is in abeyance.

Railroad Spikes Higher

Pittsburgh, July 31.—Spikemakers in a position to meet specifications for anything like prompt delivery are selling material at as high as 7c for standard sizes. The market is quotable at 6.50c to 7c. Small spikes are being quoted at the latter figure. Demand is described as heavy, although no large orders have been placed recently.

Car Buying Still Minus

Chicago, July 31.—No activity is noted in the market for railroad equipment and neither inquiries nor orders are apparent. Considerable demand has arisen during the past few days for standard railroad spikes and 5.50c to 6c, Chicago, is being quoted on some lots. Rail selling is quiet with only an occasional small lot and mills have practically nothing to offer either in standard or light rails.

Pipe Tonnages

Closed by Government for Camp Use —10,000-Ton Order is Reported

Pittsburgh, July 31.—The government continues to buy iron and steel pipe for cantonments. A Youngstown mill is reported to have received an order this week for 10,000 tons of 4 to 6-inch pipe. This material will be ready for shipment the latter part of the week. Inquiries are pending for 12 miles of 8-inch, 12 miles of 12-inch and about 25 miles of miscellaneous sizes; these transactions involve about 5000 tons in the aggregate. The price situation is unchanged. The National Tube Co. and two independent makers have made no changes in prices since April 2, last. Several independent makers, however, are asking prices $25 to $30 a ton above those of the leading interest. Demand for marine and locomotive boiler tubes is exceedingly heavy. Manufacturers of seamless tubing are being called upon for tremendous quantities for hospital and camp beds. Deliveries of the more popular sizes of seamless tubes and boiler tubes are deferred more than a year.

Divert Pipe to Government

Chicago, July 31.—Government requirements for army camps form the only feature in the cast iron pipe market. Tonnages for this purpose are larger than had been expected, although in many cases wooden pipe is being used, as a cheaper material and also because it can be obtained at once. One result of the heavy demand by the government is that stocks of small sizes at pipe foundries have been drawn upon to furnish prompt delivery until comparatively nothing remains available from this source. The government recently desired a considerable tonnage which was filled from pipe manufactured for the cities of Chicago and Cleveland, and diverted to fill the pressing need. Demand for specials for industrial use continues heavy and makes up a large part of current business. The only letting this week involves 400 tons for a contractor's job at Whitefish Bay, Wis.

Completes Big Order

Youngstown, O., July 31.—One large producer has completed an order from the government, calling for 2,000,000 feet of steel pipe varying from ¾ to 7 inches in diameter. It is understood that it will be used for heating purposes at the cantonments.

Rushing Pipe to Camps

Birmingham, July 31.—A small shipment of cast iron pipe is being rushed from Birmingham plants to Montgomery, Ala., for an extension of the waterworks service there to the cantonment being established by the government. Sanitary piping and fittings also are being rushed to Montgomery. Hattiesburg, Miss., is to get one of the camps and will in the next few days place orders for cast iron pipe and sanitary pipe also in this district. All pipe shops, foundries and machine shops in the Birmingham district are working full time.

Building Rolling Mill

The new rolling mill of the Ulster Iron Co., Dover, N. J., will be put into operation about the first of September. The production of finished steel will be increased about 50 per cent, owing to the installation of a number of new labor-saving devices.

Truck Bodies Placed

Washington, July 31.—Contracts for 24,050 motor truck bodies have been let by the war department. The International Harvester Co. received 10,000; the Grand Rapids School Equipment Co., Grand Rapids, Mich., 6400; the London Auto Supply Co., Chicago, 1900; Mulholland & Co., Dunkirk, N. Y., 500; the Hercules Buggy Co., Evansville, Ind., 400; the Theodor Kundtz Co., Cleveland, 550; the G. W. Stratton Co., Defiance, O., 1000; the Eagle Wagon Works, Inc., Albany, N. Y., 1200; and the Continental Car Co., Louisville, Ky., 2000.

Steel Corporation

Profits are Huge—Over 50 Million Set Aside for War Taxes

Total earnings of the United States Steel Corp. in the second quarter of 1917 exceeded predictions, rolling up a total of $144,498,076 as against Wall street forecasts of about $135,000,000. Earnings in the first quarter were $113,121,018. However, the management of the Steel Corp. materially reduced the total for the second quarter by setting aside $53,918,872 for war income and excess profits taxes. This amount was estimated, as the problem of taxation has not yet been settled by congress. A further allowance was made from the net surplus after dividends of $33,865,000 as the estimated amount to meet the war income tax and the excess profits tax for the first quarter of 1917. This amount also is necessarily estimated. In addition to the regular dividends of 1¾ per cent on preferred and 1¼ per cent on common, a special extra common dividend of 3 per cent was declared on common. During the six months ended June 30, 1917, there was expended on account of additions and new construction the sum of $43,000,000. The balance of surplus after all allowances and deductions for the six months ended June 30, was $71,854,717.

	Earnings sub. bonds	Less: Int. subsid. bonds	Balance
April, 1917	$29,265,739	$744,648	$28,521,091
May, 1917	31,516,386	742,835	30,773,551
June, 1917	32,027,300	742,738	31,284,562
	$92,809,425	$2,230,221	
Total earn. after oper. exp. includ. ord. repairs and main. and int. on subsid. bonds			$90,579,204
To sinking funds subsid. bonds and deprec. and extra. replacement		$14,347,399	
Sink'g funds U. S. Steel bonds		1,806,752	
			16,154,151
Net income			$74,425,053
Quarterly int. on U. S. Steel bonds		$5,326,907	
Prem. payable on bonds redeemable		224,610	
			5,551,517
Balance			$68,837,536
Regular dividends:			
Prfd., 1¾ per cent		$6,304,919	
Com., 1¼ per cent		6,353,781	
		$12,658,700	
Extra dividend:			
Com., 3 per cent		$15,249,075	
			27,909,775
Surp. for quarter			$40,965,761

Earnings for the first three months, 1917, were as follows:

Jan.	36,074,425
Feb.	33,416,171
Mar.	43,630,422

Confers With Makers

Joseph E. Davies, member of the federal trade commission, and Francis Walker, chairman of the advisory board of the economic department of the commission, held a conference with the committee of the American Iron and Steel Institute, at Chairman E. H. Gary's office, 71 Broadway, New York, July 25. The meeting was devoted to the discussion of the cost of manufacturing steel under present conditions.

Roll Plant

Of Seaman-Sleeth Co. Finally Purchased by New York Bankers

Properties of the Seaman-Sleeth Co. and the Phoenix Roll Works, Pittsburgh, were purchased July 30 by William Morris Imbrie & Co., New York bankers, for $2,000,000, and formally transferred to the Pittsburgh Rolls Corp. The new company has been capitalized at $3,000,000, of which $1,000,000 will be 6 per cent first mortgage gold bonds, $1,500,000 common stock and $500,000 7 per cent cumulative preferred stock. In addition, there is $1,000,000 common stock reserved for the conversion of bonds. Officers of the Pittsburgh Rolls Corp. are: Chairman of the board, Joseph S. Seaman, one of the best known members of the foundry trade, who had been president of the Seaman-Sleeth Co.; president, Davd L. Eynon, who had been general manager of the Seaman-Sleeth interests; vice president and treasurer, H. R. Warfield, for 10 years connected with William Morris Imbrie & Co.; secretary, H. H. Meckley, who had acted as secretary of the Seaman-Sleeth Co.

The Seaman-Sleeth Co. was organized about 60 years ago by J. S. Seaman and associates. For almost 50 years the company has specialized in the manufacture of chilled and sand iron rolls and pinions. Net profits of the company for 1912-16 were $742,992.57. In 1916 the net was $296,144.58 and for the first four months of 1917, $104,993.59. The company is installing a large open-hearth furnace.

Carbon Plant Sold

New York, Aug. 1. (By wire.)—The plant of the Carbon Iron & Steel Co., Parryville, Pa., has been sold to Albert Broden, representing the Central Railroad of New Jersey for $200,000. The railroad has held a mortgage of $350,000. The furnace will continue to operate as heretofore.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, July 31.—The metals market generally during the past week have taken on a slightly better tone. Although actual buying has continued of comparatively small volume, tin, copper, spelter, lead and antimony have averaged higher in price. The situation in Washington at this time remains virtually unchanged, still the feeling becomes stronger that the government in its price-fixing will do the fair thing. During the past few days the government purchased 23,250,000 pounds of high grade spelter at an advance of 2 cents over its previous order in May, and this was accepted by producers as a favorable indication.

Copper within the past few days has appeared stronger, and inquiries have been more numerous. Conditions, nevertheless, have remained unsettled with highly divergent prices being heard. Prices on electrolytic today may be quoted nominally as follows: Spot, 28.25c to 28.75c; August and September, 27.75c to 28.25c; fourth quarter, 26.75c to 27.25c. Prime lake copper for prompt shipment is holding nominally at 29.50c to 30c. Casting copper is quoted 25.75c to 26.50c, cash.

Prime western spelter has been in fair demand for practically all positions. Second hands have little metal left and producers generally have taken a firm stand. As a result little spelter is available at this time under 8.50c, St. Louis, for prompt and August shipment. September delivery is quoted around 8.50c to 8.62½c, and last quarter, 8.62½c. Brass special for prompt shipment is holding nominally at 9c to 9.25c, St. Louis.

Straits tin continues scarce, and prices following advances at London have gained from day to day. Spot Straits tin now may be quoted nominally 63.50c to 63.75c, New York. Buying as a whole has been inactive.

Antimony has taken a brace within the past 48 hours. Cheap holders have about gotten rid of their stocks, and the market now is largely controlled by a few big sellers. These latter interests are dealing out metal sparingly owing to their anticipation of considerably higher prices within the next couple of months. The market today on a duty paid basis is as follows: Spot and August, 15.25c to 15.50c, New York, September and October, 15.50c to 15.75c, New York.

The lead market has been firm, with but little fluctuation of prices. Leading producers still are quoting 10.92½c, St. Louis, on current contracts. The outside market at this time is holding at 10.37½c to 10.62½c, St. Louis. The strike situation in the Missouri mining camps continues a strengthening factor.

Trading in aluminum has been quiet. Consumers are buying sparingly and only for their immediate needs. Export business in the outside market also has fallen off considerably. The market today may be quoted nominally as follows: No. 1 virgin, 53c to 55c; No. 1 remelted, 51c to 53c; and No. 12 remelted, 39c to 41c.

Buying Tools for Railroad Shops

A Description of the Methods Employed by the Purchasing Departments of Railroads in Buying Machine Tools—Extreme Care Characterizes the Large Annual Expenditures for Shop Equipment

BY WALTER S. DOXSEY

THE purchasing agent of one of the large railroad systems which cris-crosses the central and western states was busy signing a huge pile of letters when I walked into his office to inquire concerning the methods employed by his department in purchasing machine tools. "Well," he said, in answer to my question, "When you want to buy anything, how do you go about it?" I told him that I usually made an effort to see just what the market offered that suited my particular need. "That," he replied, "is the answer to your question." It really was the answer, for it represents the procedure followed by the railroads.

When, however, millions of dollars are to be expended annually for upkeep and additions to the thousands of railroad shops distributed throughout the country and when this expenditure must satisfy a chary board of directors and an uncompromising interstate commerce commission, the simplicity of the matter disappears and it becomes involved in a series of complex details. A matter-of-fact purchase is complicated by the machinery of intricate systems which stretch from the most insignificant shops on the road, through mechanical and engineering departments to presidents and directors and finally end, after passing through the purchasing departments, at the points of their origin.

Railroad shops are intended primarily for repair work and although they are equipped for and are capable of building almost any piece of apparatus used on the roads, their prime function is to keep the rolling stock in good operating condition. For this reason, the shops are not always located where supplies of raw materials are the most suitable for manufacturing purposes, but are situated at various points on the many various arteries of the railroads. Capital shops which are more comprehensively equipped than the secondary shops, in general, are placed at central points on the main lines of the transportation systems. Equipment used in these main shops include almost all types of metal and wood-working tools together with such accessories as welding outfits, pumps, etc. In these central repair shops most of the heavy repairs are accomplished. Locomotives are brought to these points for retiring, new fire boxes and boiler repairs; freight cars are remodeled and passenger coaches are rebuilt. Being equipped for all kinds of repair work, such shops necessarily are able to build cars and locomotives, but, as a rule, such practice is not encouraged because of delays invoked by essential repair work and often because the shops are far removed from the source of supply of raw materials. Specialization in railroad shops is directed toward maintenance rather than construction.

Smaller shops of graduated importance are placed at numerous points on the minor branches of the system. These division shops take care of the incidental repair work resulting from the wear and tear of a day's work. Generally speaking, there is a locomotive shop in each division. Their fundamental function is to maintain the rolling stock within their particular jurisdiction. At still more distant points are to be found the many little, though important, repair shops supplied, perhaps, only with a lathe, a drill press and a milling machine and incidental tools. Round houses generally are furnished with drill presses, engine bolt lathes and bench tools.

Where repair work is of such prime importance and where so many and such a variety of tools are employed, it is impossible to lay down rigid laws regarding the purchase of new equipment. When a machine is badly needed due to some unusual or unexpected circumstance, it is secured by the purchasing department without hesitancy. However, in the run of business from year to year, the foremen and superintendents of the various shops prepare lists of desired equipment, usually once in 12 months toward the close of the railroad's fiscal year.

Long experience has taught these men to request many tools in excess of the pressing needs of their shops. Not that the foremen and superintendents are prone to be extravagant in their demands for tools, but because rarely even 25 per cent of the original lists are finally purchased. As a matter of fact, the requisitions for tools must show the cost of each tool and why the particular machine is thought to be necessary. The saving its installation will effect and the lapse of time before its cost will be recovered also must be clearly indicated. Included in these lists are the specifications covering the type of machine or tool desired. Some railroads have adopted the custom of referring

The Atchison, Topeka & Santa Fe Railway System.

General Purchasing Agent's Office, Railway Exchange.

No.....

Chicago.....

M.....

Please quote prices on following material delivered f. o. b. cars our track.....
No charge will be allowed for express, carriage or package. WHEN CAN YOU SHIP?

M. J. COLLINS,
GENERAL PURCHASING AGENT

ITEM		THIS IS NOT AN ORDER	PRICE	COULD SHIP
		QUOTE ME ON THE FOLLOWING, ADVISING HOW SOON YOU CAN SHIP AND FROM WHERE		
		CASH DISCOUNT.....10 DAYS		

ALL BIDS ON THIS MATERIAL MUST BE MAILED SO AS TO REACH ME NOT LATER THAN 6 DAYS FROM DATE OF INQUIRY AND MUST SHOW GUARANTEED TIME OF DELIVERY.
PLEASE NOTE PRICES HEREON AND RETURN.
IN CORRESPONDING REFER TO NUMBER IN UPPER RIGHT HAND CORNER.

FIG. 1—STANDARD FORM USED TO SUBMIT SPECIFICATIONS TO BIDDERS

to catalog numbers as a matter of convenience in indicating the character of tools desired. Should the proposed tool differ from the one prescribed in the catalog, a statement of exceptions is written.

List of Tools Are Carefully Analyzed

Lists of tools for proposed purchase usually are submitted to mechanical or engineering departments for approval. Corps of experts who are familiar with the equipment used in the various shops of each railroad and whose duty it is to visit machine tool builders and dealers to learn of new and improved machines, take the requisition lists and subject them to rigid examination. Because of their familiarity with the equipment in all the shops, these departments often are able to transfer machines, obsolete in one shop, to another where they will serve satisfactorily in place of tools suggested for purchase by the foreman. Using their knowledge of tools produced by the various builders, the engineers are, in many cases, in a position to change the specifications and indicate tools better suited for a particular purpose, often at a considerable saving. When the mechanical engineers do not feel that the expenditure for a certain tool is justified, it is stricken from the list or a cheaper tool is specified in its place. Upon looking over the machine tool lists of railroads, it will be noticed that there is little call for single-purpose tools. This is due almost entirely to the fact that the shops are designed for general repair work.

Note: All machines shown as motor-driven must be arranged for motor connections and the horsepower of motor required to guarantee maximum output of each machine specified.

All belt-driven machines must include countershafts.

ITEM	NUMBER WANTED	DESCRIPTION OF MACHINES	KIND OF DRIVE
42	1	Planer, 48 x 48 inches, 10-foot bed with two heads on cross rail and two side heads. With reversing motor drive	Motor 220 V., D. C.
43	1	Crank planer, 24 x 24 inches, 48-inch stroke, with double or combination head on cross rail..	Motor 440 V., A. C.
44	1	Shaper, 28-inch stroke, with 16-inch jaw vice...	Motor 440 V., A. C.
45-46	2	Slotters, 18-inch stroke, with rapid traverse for all movements of table. Quick-change arrangements for feeds and speeds.....	Motor 220 V., D. C.
47	1	Heavy-duty universal milling machine, distance between end of spindle to center in arbor yoke, 32 inches. Distance from face of column to brace, 29 inches. Table 48 x 12 inches.....	Belt

FIG. 2—ALL TOOLS ON THIS LIST ARE NUMBERED TO CORRESPOND WITH HANDY REFERENCE FILES

Reclaiming Worn-Out Tools

As a rule, worn and used tools from the large shops are gradually moved to the secondary shops, where, with a few alterations and repairs, the tools, useless in one shop, are made serviceable for another and avoid the purchase of new tools. This process continues until the tools are worn beyond repair and finally are advertised in the scrap lists of the railroads or their parts are reclaimed for remaking other tools and for similarly useful purposes. Thousands of dollars are saved annually from the machine tool scrap heap by combining the useful parts of decrepit machines with new pieces here and there to make serviceable tools for the various shops. Each railroad maintains a record or log of every tool in its shops, showing when it was purchased, for what shop, and its subsequent use in other shops.

In one specific instance, the lists submitted by the shop heads are scrutinized by a committee consisting of the superintendent of shops and the head machinist, together with their assistants. These men visit the many shops on the road, attend machinery conventions and call upon the machine tool builders and dealers. Their specialty is to know what equipment is used in the shops and what tools are available for purchase.

The revised requisitions or budgets for shop equipment are usually submitted to the vice president or some high executive who generally indicates his authority by sharply reducing the appropriations desired. Another reduction takes place as a rule, when the budget is considered with all other budgets for yearly expenditures by the board of directors. Shop superintendents in asking for more tools than they expect to receive, simply do so as to allow for the cutting down of the requisitions by officials controlling expenditures which they know from experience will be forthcoming. Under present conditions, rarely do finance committees allow the purchase of all desired tools.

After being revised by the board of directors, the budgets are returned to the mechanical engineers or superintendents of shops who consult with the shop foremen and determine what tools may be eliminated from the lists. In many cases the same tool is requested for three or four years before it is finally purchased.

The Role of Purchasing Departments

When the final lists have been adjusted to suit the appropriations, the specifications are prepared for the dealers and builders and the purchasing departments are requested to ask for bids. Accompanying illustrations show the general forms employed by railroads in sending out specifications for bids. Some roads send a general letter covering the entire list with added specifications for each tool. Each tool desired is identified by a number appearing on the budget and on the list of specifications. One purchasing department has adopted a system of identification which gives a serial number in regular rotation to all the tools purchased during a year, as shown in Fig. 2. Builders and dealers mention this number when bidding. A numbered envelope is provided for each tool in which is preserved all bids and data relative to the purchase of the tool. A special indexed reference book is also maintained in which is filed a copy of the order with all the information regarding the purchase of the tool in condensed form so that it is quickly available.

Customarily, specifications for bids are submitted to a carefully selected list of both builders and dealers of machine tools. Regardless of the specialty of individual sellers of tools, the lists are seldom divided and are submitted in their entirety. The obvious reason for this is to give the requirements of the railroads a wide circulation for often a builder or dealer is in a position to supply tools from sources unknown to the purchasing departments of the railroads. When the entire budget for a year is to be purchased, the specifications have a circulation, in some cases, of over 100. This matter depends largely upon the personnel of the individual purchasing departments. When, however, only a few tools are to be bought, the number of specifications sent out is likely to be more limited. Sometimes the entire list is quoted upon and in many cases bids on only a few tools are submitted.

Railroads are Exacting

Purchasing departments require from the sellers of tools complete specifications, the price and the time of delivery. Often blue prints of foundations must also be furnished. Thirty days, approximately, are required from the time of mailing specifications until

the last bids are in the hands of the purchasers. No set time is established for the opening of bids and the allowed interval between the mailing of specifications and the receipt of the last bids is entirely at the discretion of the purchasing agents.

After all the bids have been received, the data are classified and tabulated. This work requires in some cases as much as 30 or 60 days. If the total cost of the tools exceeds the appropriation, items are eliminated by the shop engineers until the expenditure will fall within the limits of the funds provided.

The tabulated specifications and bids from the dealers and builders are carefully analyzed by the engineers before the orders are placed. An opportunity is provided here for further saving or to secure more satisfactory equipment. If the seller's specifications correspond precisely with those of the engineering departments, as a rule, orders for the tools are placed immediately. Questions in regard to preference of types are, of course, referred to the shop authorities. In case of striking similarity of tools made by different builders, the determining test generally is the factors of cost and delivery.

Coal Supply Adequate

Bituminous coal production in the United States during the first six months of this year was 270,000,000 tons, thus establishing a record and exceeding the output of the corresponding period of last year by 20,000,000 tons, according to a statement regarding the coal situation made by Franklin K. Lane, secretary of the interior. Secretary Lane believes that the limit has not yet been reached, for as the railroads are able to work out to better advantage the problem of car supply, thus giving the mines greater transportation facilities, there must be a steadily increasing supply of coal available for the consumer. "Despite the extra demand in this country," Secretary Lane continues, "and the urgent needs of our allies, no one with the facts before him can doubt that the coal industry, under careful guidance of those now directing its welfare will be able to supply all needs." During the winter the difficulties of coal transportation will be intensified, but it is said that a sensible economy, coupled with increased power plant efficiencies and expeditious unloading of coal cars will alleviate this condition.

A new plate mill at the plant of the Donner Steel Co. has been placed in operation.

Safety Standards for Transmission Machinery

A tentative draft of a code of safety standards for power-transmission machinery designed to protect industrial workers from the hazards commonly presented by equipment for transmitting and distributing power has been prepared under the direction of the National Association of Manufacturers for the consideration of the American Society of Mechanical Engineers. The use of properly designed, constructed and installed individual motor-driven equipment, according to the introduction of the code, not only eliminates many of the dangers demanding this code but also gives an uninterrupted distribution of natural and artificial light, and a greater flexibility and range of speeds than is possible with mechanical power-distributing systems. The proposed specifications describe standard guards for all power-transmission equipment such as gears, vertical and horizontal belts and numerous miscellaneous devices. Protective guards for main shafts, jack shafts and counter shafts are also outlined.

Working Hours, Fatigue and Production

The effect of long working hours and fatigue upon the health of laborers in British munition factories is discussed in a bulletin recently issued by the United States department of labor. This is the first of a series of bulletins prepared at the suggestion of the council of national defense for the purpose of giving wide circulation to the experiences of Great Britain, France and Canada. The first bulletin contains the reprint of eight memoranda published by the British health of munition workers' committee and deals with the relation of hours of work to output, Sunday labor, industrial diseases, ventilation and lighting.

From these data it appears that Sunday labor is not profitable and that continuous work is a "profound mistake". The committee recommends that the hours should not exceed 56 per week for men engaged in heavy labor, or 60 for men engaged in moderately heavy work, while 64 should be the maximum. Speaking from the standpoint of maximum production, it is further recommended that all employes be subjected to medical examination and that sanitary facilities and safety devices be installed. In regard to the prevention of industrial diseases, particular attention is paid to the importance of proper lighting and ventilation to maintain the efficiency of the laborers. Fatigue and the introduction of new labor with which the workmen are unfamiliar are the causes responsible for the majority of accidents. Other pertinent factors contributing to the increase in industrial accidents are the employment of unskilled labor, increased pressure for larger output and the disregard and nonenforcement of safety regulations.

Typical List of Machine Tools in Railroad Locomotive Repair Shop

(Not Including Tool Room Equipment)

Engine Lathes.

1	14-inch x 6-foot
5	16-inch
1	18-inch x 8-foot
1	18-inch x 10-foot
1	18-inch x 12-foot
2	24-inch x 10-foot
3	24-inch x 12-foot
2	24-inch x 14-foot
1	24-inch x 20-foot
1	30-inch x 16-foot
4	36-inch x 13-foot
1	38-inch x 14-foot
2	42-inch

Turret Lathes.

1	20-inch
1	20-inch x 7-foot
3	24-inch
4	36-inch
1	3-inch x 36-inch
1	Brass turret lathe

Wheel Lathes.

1	60-inch
2	90-inch

Slotters.

2	12-inch
2	13-inch
1	24-inch

Boring Mills.

1	30-inch
1	36-inch
2	42-inch
1	51-inch
1	54-inch
1	96-inch
1	Cylindrical Boring Machine

Drills.

1	20-inch
1	24-inch
1	30-inch
2	34-inch
2	36-inch
1	60-inch
1	72-inch
1	4-spindle

Shapers.

1	18-inch single head

Planers.

1	40-inch x 12-foot
1	42-inch
2	42-inch x 12-foot
1	60-inch x 60-inch x 26-foot
1	72-inch x 72-inch x 32-foot

Millers.

3	Plain
1	Horizontal
1	Vertical

Grinders.

1	Oscillating surface
1	Universal
2	Wet
1	Tool

Miscellaneous Tools.

1	600-ton hydraulic press
1	38-inch band saw
1	Quartering machine
1	Pipe machine
1	2½-inch bolt cutter
1	Keyseating machine

Fig. 1—Typical Steel Mill Roll After Grinding—Note the Size of the Roll Compared to the Man at the Left

Grinding Large Rolling Mill Rolls

Many Problems Are Presented When Big Rolls For Sheet or Plate Mills Are Ground—Modern Tools Are Designed to Minimize Loss of Metal and Insure Accuracy

BY HOWARD W. DUNBAR

ROLL grinding is a term applied to the finishing of rolls used in rolling mills where plate and sheet metal are manufactured. It is essential that roll grinding be as accurate as any work in the grinding field. The rolls must be absolutely parallel where they bear together in order to insure uniform thickness throughout the entire length of the sheet of metal they roll. When it is necessary to grind a taper in the face of a roll, it must be within very close limits in order to accomplish its purpose. Until the development of the modern types of roll grinding machines, roll grinding was merely a polishing operation.

Types of Rolls

Rolls vary in size from very small ones for rolling ribbon stock, which may be 8 inches or 12 inches on the face and from 6 inches up to 10 inches in diameter, to rolls for rolling armor plate and very wide sheet steel, which range in diameter from 18 inches up to 60 inches, and in length are 14 feet to 15 feet on the roll face. These rolls take various forms depending upon the use to which they are to be applied and the manner in which they are used in the rolling mill.

Ordinarily, in rolling ribbon stock the face of the roll must be slightly crowned. In long rolls of small diameter it is the practice to slightly taper the face from both ends, keeping the highest part in the center of the roll. Other types of rolls are simply ordinary cylinders of extremely large dimensions.

Each of these various types of rolls takes its shape for some technical reason in the production of the particular kind of material which it is to handle, and these technicalities have a bearing on the grinding problem only in so far as they affect the problem of handling them in the grinding machine. Rolls are commonly made from either chilled iron or steel.

Rolls are used in the rolling mill by placing them one above another in various combinations, sometimes two high, sometimes three or four high, depending upon the type of rolling mill and the quantity and kind of material being produced. They have various names, depending upon the function they perform. Some are known as "backing rolls", others as "reducing rolls". The backing rolls are the rolls that back up or give support to the extreme pressure and weight brought to bear when this operation is being performed, and the reducing rolls are those through which the hot billet is passed in reducing it in thickness or size. Some call the large diameter of the roll the "face", others the "body"; "neck" is a common term for that part of the roll commonly known to most mechanics as the "journal".

Rolls have to be removed from the mill periodically, because of wear. They are then trued to the desired form, and this operation is known as roll dressing. The two common methods of dressing rolls are by means of the heavy roll lathe and the modern grinding machine. Grinding as a method of dressing rolls is a very old practice, but up to the time of the modern roll grinding machine this practice was merely what would be termed a polishing operation, primarily because the machines employed were so light in construction as not to be capable of rapid production. The grinding machine as a means for removing a large amount of material was never employed until recently.

Rolls are Expensive

In dressing rolls every thousandth of an inch that can be saved on the diameter increases the life of the roll. Take for example a roll 39 inches in diameter and 140 inches on the face. This roll is worth approximately $1800. The chill is about 1 inch deep. The life of the roll is the time of service before this chill has been exhausted, so that every thousandth of an inch retained on the diameter means considerable money saved. It has been estimated that a roll dressed by grinding has 50 per cent longer life than one dressed by turning and a comparison of experiments in turning and in grinding show that it takes approximately 1/64-inch more off the diameter to true up the same roll in the lathe than in the grinding machine and sometimes as much as ⅛-inch more.

By the grinding process, the necks and the roll face are concentric with each other within very small limits,

This article is reprinted from the *American Machinist*, July 5. The author, Howard W. Dunbar, is connected with the Norton Co., Worcester, Mass.

which results in quite a material saving in babbitt because of the truth of the journal or neck, and less wear in the bearings. The exact amount of this saving is not known, but is reported to be quite a factor in large plate mills.

It is possible with large grinding machines to produce rolls which will be accurate within 0.00075-inch for parallelism and roundness which, when considered in comparison with the usual accuracy found in such work, is very nearly perfect.

Finish Required in Roll Grinding

The degree of finish required for hot or cold-rolled plate varies materially. In hot-rolled plate the finish on the roll need not be as fine nor as smooth as on rolls for producing cold-rolled plate. In the latter case the face of the roll must be absolutely true, smooth and free from scratches, as every imperfection in the face of the roll is reproduced in the surface of the metal being rolled. In hot-rolled plate varying finishes are required in the different materials, depending on the conditions, the type of roll, material being used and the personal bias of the roll-mill operator or superintendent. Some desire a rough mat finish because they feel that it drags the plate through the mill more easily; some desire a smooth finish, while more are not so particular. In all cases, however, roundness is insisted upon regardless of the finish on the face of the roll.

Methods of Grinding

There are two methods commonly employed in grinding rolls. In one, the roll is supported on centers, one in the head and one in the footstock of the machine. The other method is to grind them revolving on their own neck bearings, in specially designed supporting blocks, commonly known as pillow blocks or roll-neck bearings. The first mentioned method is usually employed on light rolls that can be supported on centers with but little difficulty. For example, rolls up to 20 inches in diameter and 60 inches long on the face are commonly handled by grinding on the centers, and there have been cases where rolls as large as 30 inches in diameter and 120 inches long in the face have been successfully ground by this method. But the better way for the larger type of rolls is to support them on neck bearings, in the same manner that they are supported when in use in the rolling mills.

It does not always follow that because a roll is round and concentric with its axis and ground while rotating upon its own journals it is practically a perfect roll. The degree of perfection depends largely upon the accuracy of the center holes on which the journals or necks were turned; that is whether these journals or necks are round and in line with each other. Often cause of error is the imperfections of the lathe spindles on which the necks were turned or the eccentricity of the center point in the rotating spindle. Careful tests with a good indicator reading to thousandths would probably show nearly every roll lathe to have a spindle bearing not round and a center point not true; also, an examination of the center holes in the rolls will show that very few are true.

It is customary for all mechanics who grind really accurate work in tool making, machine building, etc., to grind on two dead centers which is the only method of obtaining perfect work. With a view of ascertaining the truth, certain tests have been conducted in connection with both methods of grinding—that is, grinding with the roll supported on two dead centers and grinding with the roll turning on its own journals—which resulted in the following conclusions:

1. If the necks or journals are perfectly round over their entire length and if the two necks are in perfect line with each other, the grinding of the roll when rotating on the necks will give perfection, not otherwise.
2. Not a single roll examined had necks that were round or in line.
3. Not a single roll examined had round center holes on which to produce round journals or necks.
4. When the center holes were scraped to remove the imperfections, the necks could be made round only by grinding them while rotating on these perfected holes and on two dead centers which were also ground perfectly round.
5. When the center holes are near enough round to grind the necks perfect when rotating on perfect center points, the body of the roll could be ground perfectly round and concentric with the necks while rotating on the same centers.
6. A grinding machine rigid enough to grind perfect necks on centers is also rigid enough to grind perfect bodies on centers.

Centers are Important

To successfully grind on centers, the center must be big and strong, and made of good material. The center holes in the ends of the rolls must be perfectly round, true and large enough to engage a sufficient surface on the center to insure the roll being supported without springing the center and to present a large surface for wear. Center holes should have a drilled clearance hole for the point of the center. The most successful practice is to use center holes of a 60-degree angle in the work with the mouth of the angle large enough for a center of the necessary strength to support the heaviest work. It is not uncommon for the rollmaker to use a special center of 90-degree angle or some other angle more obtuse than 60 degrees as a preventive against breakage of the center point. Care should be taken that the center holes are round and they should be guarded against damage in the mills. This is extremely important.

Truing Roll Necks

In truing up the roll necks (which is always done in order to keep them round and concentric with the roll face), the two methods are also employed. The most common method, however, is to support the roll on centers, although specially designed neck bearings have been made, making it possible to grind the necks

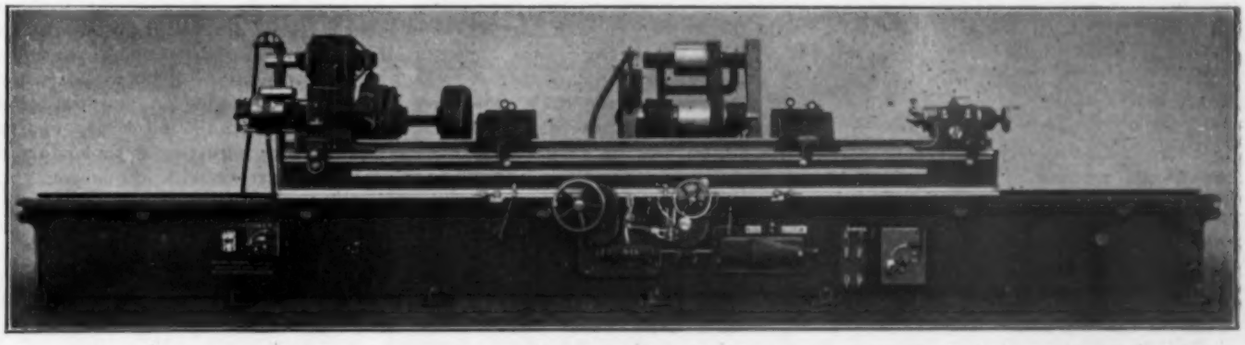


FIG. 2—FRONT VIEW OF REGULAR TYPE CYLINDRICAL GRINDER ARRANGED FOR ROLL GRINDING

while they are revolving on their own bearings. This operation of grinding necks requires that the corner of the wheel be trued to a radius in order to produce the fillet which takes the thrust of the roll, when the rolls are in operation in the rolling mill. Such fillets range from ⅛-inch to 3½ inches.

The ordinary type of cylindrical grinding machine is commonly employed for producing rolls of small diameter and light weight. The method is no different from that ordinarily employed in grinding cylindrical work. In Fig. 2 is shown the type of cylindrical grinding machine arranged for roll grinding, built by Norton Co., Worcester, Mass. A notable difference exists between this machine for grinding comparatively small rolls and the special machine, shown in Fig. 3, for handling the larger rolls. In the regular machine the work is supported on a moving table and travels in front of a fixed wheel, whereas in the larger type of machine the work is fixed on the work base and the wheel is traveled back and forth over the surface being ground. The latter method is more convenient in handling large rolls of several tons weight. When the work table becomes so heavy that it is not an economical proposition to move it, the work should be fixed and the lighter member, which is the wheel, reciprocated. It will be noted also that in a machine for large roll grinding the operator is positioned on a carriage opposite the wheel so that he can with ease control the operation of the machine and at the same time see the point where the wheel comes in contact with the work. Where the work is small, this, of course, is not a matter for consideration, as the operator can look over the moving table and down to the point of contact of wheel and work.

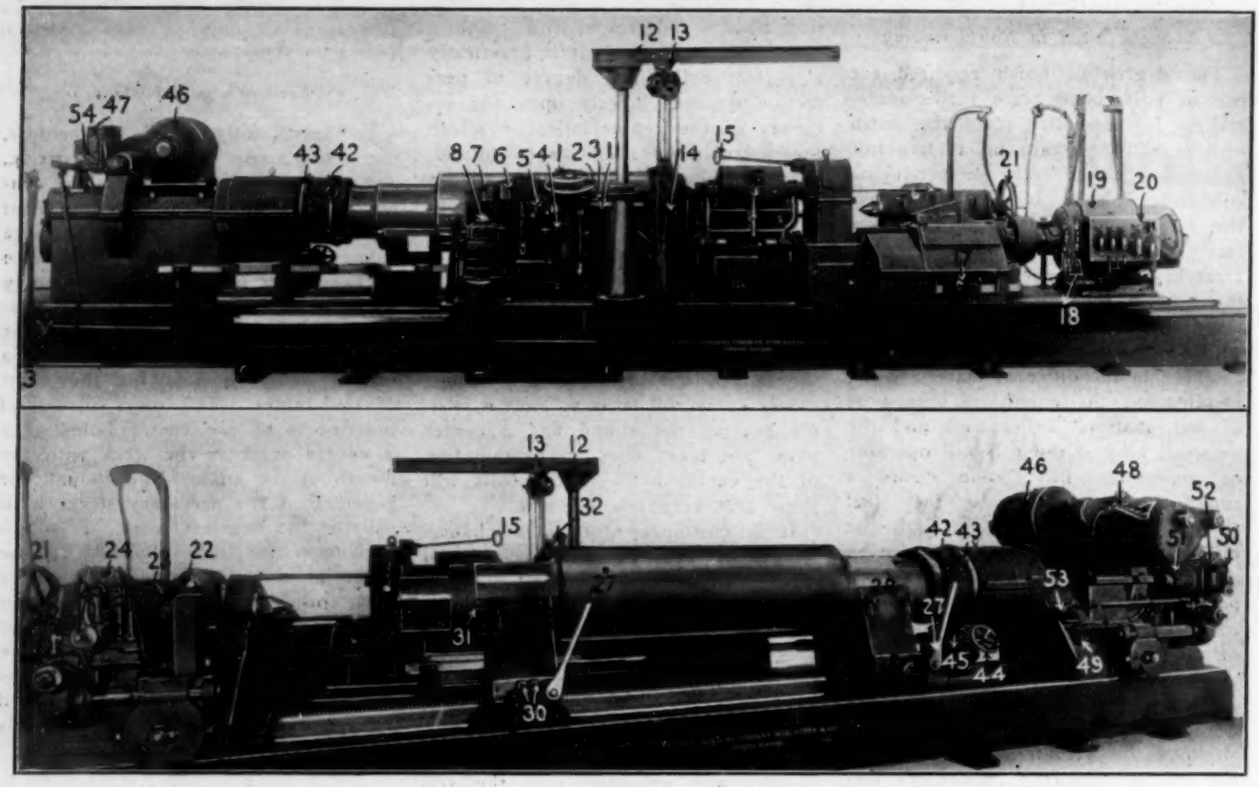


FIG. 3—VIEWS OF SPECIAL ROLL GRINDER WITH TRAVERSING WHEEL; ROLL IN POSITION

1, wheel slide control handwheel. 2, wheel table control handwheel. 3, lever to throw from hand to power feed. 4, power wheel traverse. 5, reverse lever. 6, electric switch controlling footstock. 7, electric switch controlling headstock motor. 8, pump motor. 11, crane handle for feeding wheel in and out. 12 and 13, crane and fall for lifting wheel or wheel spindle in or out of the machine. 14, special hook to engage wheel when lifting out. 15, lever for stopping movement of table. 16, belt tightener on wheel spindle frame. 17, speed shift lever for table travel. 18, switch for starting wheel-drive motor. 19, motor driving wheel and wheel table. 20, rheostat for starting. 21, footstock hand wheel. 22, footstock binder bolt. 23, footstock motor. 24, footstock motor control. 25, switch handle for footstock traverse. 26, reversing lever for footstock traverse. 27, neck bearing ratchet for moving journal rests. 28, neck bearing supports or journal rests. 30, screws for moving upper part of journal rest. 31, bolts for moving shoes in journal rests. 32, water pipe control. 42, union for driving roll. 43, support for supporting universal joint. 44, handwheel for support rest on universal joint. 45, rolls on support rest. 46, headstock motor for work drive. 47, work-drive motor-starting mechanism. 48, speed change lever control. 49, headstock-motor starting switch. 50, headstock-motor control. 51, headstock motor. 54, work-drive motor switch. 52, headstock-motor control.

Description of Roll Grinding Machine

The large roll grinding machine, illustrated in Fig. 3 is believed to be the only machine ever designed exclusively for the finishing of rolls for rolling mills. This machine employs the method of moving the wheel back and forth over the face of the roll being dressed. The wheel is supported on a carriage upon which the operator stands, where he is in full view of the wheel and can readily see the point where it comes in contact with the work. Although this wheel is moved instead of the work, it is just as much fixed in relation to the work being ground as though it were mounted upon a stationary base. The essential elements of this machine for the dressing of large rolls are a work-carrying base with supporting heads, either in the form of centers or journal rests or pillow blocks; means for revolving the work; a base for supporting the wheel (which must be adjustable in and out from the work), and the necessary control mechanisms, adjustments and conveniences consistent with the design.

Rolls are usually revolved at a surface speed ranging from 100 to 200 feet per minute, and the wheel is revolved usually from 4500 to 6000 surface feet per minute. The table travel or wheel travel is regulated so

(*Concluded on page 237*)

Russia Calls American Enterprise

Vast National Resources of Slavic Nation Offer Rich Field for Manufacturing Development in Iron and Steel and Machinery Lines—Machine Tool Plants Needed—Partnership With Native Business Men Important

BY GEORGE S. WEINBERG

RUSSIA often is spoken of industrially as a virgin country. This is fundamentally incorrect and creates in the minds of those who are not familiar with Russia an impression that there are no industries there. The immense natural resources of Russia probably are responsible somewhat for the fact that the industries are not proportionate to them. For any country, for instance, 45,000 miles of railways would be a very large amount. Many more miles of railways are needed, however, before Russia will feel that it has sufficient transportation facilities. The fact that during normal times prior to the war the 45,000 miles of Russian railways were supplied for a period of 10 years by material which was mined, smelted, rolled or manufactured in Russia exclusively is a direct indication of the extent of the Russian industries. For a period of 15 years, from 1898 to 1914, Russia did not import a single locomotive or railway car or a ton of rails or any other material used by its railways.

Equipment Industry is Extensive

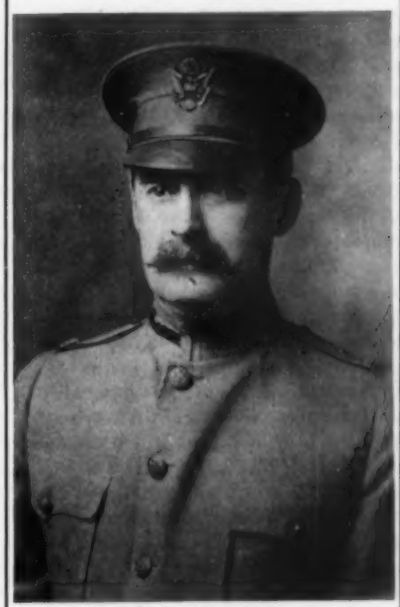
As an illustration of the extent of the railway equipment industry in Russia, the normal production of Russian locomotive makers is about 1250 locomotives yearly. They are produced by the following works: Poutiloff Works, Petrograd; Nevsky Works, Petrograd; Kharkov Works, Kharkov; Hartma Locomotive Works, Logansk; Briansk Locomotive Works, Alexandrovsk; Colomna Locomotive Works, Colomna and Sormova Locomotive Works, Nijni Novogorod. All these are private corporations. In addition, there is the government-owned Votkinsky Works, near Perm, which has been making some locomotives for the government. These several works are not manufacturing locomotives exclusively, but are engaged in other lines of manufacture, and therefore a production of 150 to 200 locomotives annually for each of them represents a fairly large manufacturing proposition. In fact, the Poutiloff, Briansk, Colomna and Sormova works also manufacture railway cars and other railway supplies. They therefore represent very extensive manufacturing enterprises and employ a large number of men. At different times the Poutiloff works employed as many as 25,000 men in all branches of their manufacture. In addition to the above four interests, the following manufacture railway cars: Petrograd Car Works, Petrograd; Phoenix Car Works, Riga; Russo-Baltic Car Works, Riga; Tver Car Works, Tver, formerly a branch of the French company, Dill et Backalan; Mitchistchi Car Works, near Moscow; Maltzeff Works, near Orel; Kiev Car Works, near Kiev, and, prior to the war, Lipop, Rau & Loevenstein, Warsaw.

The normal production of the car builders amounted to about 30,000 cars yearly, but they could produce a considerably larger quantity and probably up to 50,000 cars yearly. In locomotives and cars, therefore, a very fair beginning has been made. Unquestionably new railways will be built extensively after the war, and there is no doubt whatever that all railway material for the new lines will be manufactured in Russia and will make it necessary that new industries be created. There are mineral deposits in abundance to be developed, and those deposits which already have been worked will have to be extended. New manufacturing plants of all kinds will have to be established and the old ones considerably enlarged. It is particularly in the production of railway equipment that the American manufacturer will find profitable fields, and Russia will be only too pleased to have American manufacturers start plants of their own in that country.

Iron and Steel in South

The iron and steel for railroad equipment manufacture has been obtained mainly from the Donetzk district where is located the major portion of the iron ore and coal-mining industry of Russia. This district lies in the southern part of Russia, somewhat north of the Black and Azof seas. The tendency for coal deposits is more toward the eastern portion, whereas the iron-mining industry is in the western part. In some sections the iron ore deposits are not very far from the coal deposits, and here most of the blast furnaces in this particular district are located. Both anthra-

Expert on Russia



GEORGE S. WEINBERG, an authority on business relations between the United States and Russia, was born in Russia in 1872. He came to this country in 1894 and obtained his post graduate education as mining engineer at the Michigan college of mines in 1900. At that time, realizing the great possibilities for the sale of American products in Russia, Mr. Weinberg familiarized himself with American products and methods of doing business and to this end he spent several years in the service of a number of large industrial companies in this country. He has been instrumental in developing an appreciable share of the American export trade to Russia. Among companies which he now represents are the Worthington Pump & Machinery Corporation, the Cleveland Twist Drill Co., the McMyler Interstate Co., the National Lead Co., and others. He has done a considerable amount of consulting engineering work in Russia, both in mining and mechanical branches. His main office in Russia is located at No. 6 Nevsky Prospect, Petrograd. His New York headquarters are at 120 Broadway, and he usually spends on an average of six months a year in this country. Mr. Weinberg long has been an American citizen and recently obtained a commission as major of engineers in the engineer officers' reserve corps. He is about to leave for Russia on a three months leave of absence.

cite and bituminous coal are mined here rather extensively, the anthracite mines being located on the River Donetz and on the railway lines between Rostoff, Taganrog and Novotcherkask. Bituminous coal of best coking qualities is found in the district around Lugansk, south of Kharkov, and also in the district known as Hughesovka. Iron ore is located in the district of Hughesovka and more towards Ekaterinoslav; large iron ore deposits also are found in the district where is located the township of Krovoy Rog.

Russia is known to have three prime, distinct and separate iron and steel-producing districts, designated as the Polish, South Russian and Ural. The largest of these is the South Russian, and here are located the biggest number of and the largest blast furnaces and steel mills. Quite a number of companies operating in this district are controlled by foreign capitalists, and include several Belgian and French and one English organization. The largest company is the Russo-Belgian Co., which controls very extensive coal and iron-mining properties and the largest blast furnaces and steel works. Both bessemer and open-hearth steel are produced and all kinds of finished products are manufactured from the largest plates for shipbuilding purposes to the smallest wire used in cable manufacture. This company employs up to 30,000 men in all its different mills and mines and its product compares favorably with similar products made anywhere. A French company operating at Drushkovka, which has also a very large establishment in Poland, known as Hutta Bankova, although somewhat smaller than the Russo-Belgian Co., also employs not less than 25,000 men in all its enterprises, and the same may be said about its products as well as the products of the Russo-Belgian Co.

Russian Products Well Known

Of great importance and undoubtedly one of the most interesting companies in Russia is that known as the Novorosisk Co., of Hughesovka. This company was formed by John W. Hughes some 65 years ago and it owns, controls and operates coal and iron mines, coke ovens, blast furnaces and steel mills. This company was purchased about a year ago by a syndicate of manufacturers from Petrograd who are planning to transfer their mechanical industries down south and will depend upon the Novorosisk Co., for the iron and steel. The Novorosisk Co., as well as the Dneproviene, a Belgian company, and the Donetsk Metallurgical Works of Drouschkovka have large steel rail rolling mills.

Next in importance, from the standpoint of modern methods and equipment, is the Polish coal and iron-mining district, although the amount of minerals mined there is very much smaller than that produced in the Ural mountains. Since this district has been occupied by the Germans, it is very difficult to foretell in what condition it will be returned to Russia. Prior to the war, there were several large coal and iron-mining companies, with very extensive blast furnaces and rolling mills in addition to the Hutta Bankova, such as Hutta Katarina, Count Renard, Messrs. Fitzner & Hampner, extensive boiler manufacturers, also the Sosnovitze Tube Works. The Count Renard Works and the Sosnovitze Tube Works were manufacturing extensively welded tubing as well as Mannesman seamless tubing.

Iron mining in the Urals is known to have originated some 200 years ago. At certain periods in its history the products of its mines and blast furnaces were known throughout the world because of their superior quality. The magnetic iron ores which are extensively used in the Ural mountains are very low in sulphur and phosphorus, and having been smelted in blast furnaces using charcoal exclusively, produced the very best quality of puddling iron. This was used for the production of the celebrated Russian sheet or roof iron known all over the world. At present the best known companies are the Demidoff Steel Works, the Jakovleff Steel Works, the Bogoslov Works and the Kischtim Works, the Strogonoff Metal Metallurgical Works, the Shuvaloff Metallurgical Works and the Nevianski Metallurgical Works. Most of these companies are beginning to use coal for their blast furnaces in view of the fact that the forests have been considerably cut down in their immediate vicinity. At the Bogoslov works trials have been made to run furnaces on coke made from a poor quality lignite coal, powdered and briquetted prior to coking. The trials have been conducted for some time with considerable success and great hopes are being based upon the use of this coal in the future. Other companies are depending for their coal supply on deposits recently discovered and developed, some in the central and others in the southern part of the Ural mountains. The companies operating in the Urals do not compare in extent of production with the South Russian companies, but due to the fact that they employ a considerable number of men in their wood fuel department, they are also fairly large industrial enterprises, employing as many as 10,000 to 15,000 men for each of the establishments.

Recent statistics indicate the extent of the iron and coal industries of Russia. The pig iron production for 1911, 1912 and 1913, respectively, was 3,593,000, 3,726,000 and 3,801,000 tons. The coal production for 1911, 1912, 1913 and 1914, respectively, was 29,361,000, 33,775,000, 37,188,000 and 36,415,000 tons.

Need Machine Tool Plants

In addition to the works mentioned, there are numerous smaller companies producing such products as tubing, wire, cables, bolts and nuts, rivets, nails and commercial iron and steel in all shapes, so that it is easy to realize the industry is established and will expand with the further development of the country. What Russia was lacking considerably immediately before the beginning of the war was facilities for manufacturing equipment of certain kinds, such as machine tools and agricultural machinery, but even in that line there are numerous works. The following manufacture machine tools: Gerlach & Pulst, Warsaw; Bohrman & Schwede, Warsaw; Rohn & Zelinsky, Warsaw; Mantel Works, Riga; Klein Bros, Riga; Phoenix Mfg. Co., Petrograd, and Bromley Works, Moscow.

These companies make an extensive variety of machine tools, as well as steam engines and naphtha motors of different sizes, including very large ones. Russia has been very lenient toward the use of diesel motors, due to the fact that Russian oil can be had at very reasonable prices. In fact, diesel engines were manufactured in Russia before they were manufactured anywhere else outside of Germany. The following plants have been concentrating on the production of diesel engines: Ludwig Nobel Works, Petrograd; Kolomna Works, Kolomna; Felser Works, Riga; Sormova Works, Nijni Novgorod; Nikolaiev Shipbuilding Works, Nikolaiev; and Kharkov Locomotive Works, Kharkov. The list indicates clearly that the number of companies is not very extensive and that there is plenty of room for more to supply the needs of those manufacturing establishments which are already in existence in Russia, but particularly those which are to be started as soon as the country will be ready for further industrial development. The same statement may be made with reference to agricultural implements, in which line a few companies are manufacturing specialties. The proportion of agri-

cultural implements and machinery imported, to those manufactured in Russia, is such that the establishment of additional plants to produce these lines with entire confidence can be expected to result successfully.

Partnership is Essential

There is every indication when more normal conditions are established after the war, the Russian government will have to create facilities which will lead to the development of the industries working extensively the mineral deposits of the country, as well as to the development of the railway system. This will have to be followed by such tariff regulation as will stimulate the establishment of manufacturing plants. Under these conditions, American manufacturers will find it advantageous to establish plants of their own in Russia. If in their organizations they will unite with Russians who have experience in the same line, there is every reason to believe that such united efforts would bear the best results. Russian labor conditions and business transactions require specific knowledge and it is quite natural that the American manufacturer should look for co-operation on the part of Russians before creating an establishment in that country. They then will be able to apply their knowledge as to how to manufacture, based on their experience at home, under the guidance of men acquainted with Russian methods and conditions. Numerous foreign manufacturers who have pursued this method in different lines have been highly successful and many of the large industries in Russia are under the management of one Russian manager and one foreign manager, working in co-operation.

This method has been thoroughly understood by the French, Belgians and Germans and prior to the war numerous manufacturers of these nationalities started branches of their own in Russia. Demand for their goods has been very much in excess of their ability to supply them and hence they have been prosperous practically without exception. It will, therefore, be quite natural for American financial, technical and manufacturing interests to build themselves up in Russia by this time-proved method. Their field of most promise is in the manufacture and sale in Russia of such specialties as small tools, implements of all kinds and machine tools, as in practically none of these lines are there enough manufacturers in Russia, and the demand for such articles will be continuously on the increase for many years to come.

Iron Production

In Manchuria is Developing Rapidly—Many Deposits Found

Investigations of ore deposits started soon after the Russo-Japanese war have resulted in the establishment of blast furnaces and steel mills by the Penchihu Colliery & Mining Co., Penchihu, Manchuria. Native ore, obtained from the company's iron ore mine at Miaoerkou, 25 miles distant, is used. The mineral bed is extensive. It starts from South Huangpaiku, near Nanfen, on the South Manchurian railway, and forms the backbone of the mountain range crossing the Miaoerlkou valley. The iron ore veins extends fully 5 miles north to Heipeikou and its outcrops are traceable farther on. From the outcrop on the summit of the mountains down to their foot, there is a distance of 1741 feet, perpendicular, while over the sloping hillsides the distance to the foot is about 2500 feet. The deposits occur irregularly, covered with schistose rock. This rock runs almost vertically with the bed and varies from 200 to 600 feet in thickness.

While of extensive magnitude, the bulk of the ore bed consists of poor ore containing but 30 to 40 per cent of iron. It is interspersed at places with rich ore containing 60 to 70 per cent of iron. No accurate estimate of the rich ore has been made but it is thought that the extent of it is considerable. At the present time only the rich ore is mined; however, with the completion of an ore-separation plant designed on the Grondal system and now building, it is thought that large quantities of the poorer ores can be utilized.

Measuring Temperatures of Steel

A paper entitled "Temperature Measurements in Bessemer and Open-Hearth Practice," was recently issued by the United States bureau of standards.

The problem of the temperature measurement and pyrometric control of furnace casting and ingot teeming temperatures is shown by a series of observations taken in several steel plants to present no serious difficulties or uncertainties. For this purpose the most satisfactory type of instrument is one of the optical pyrometers using monochromatic light and permitting observation from a distance. The necessary corrections to the observed optical pyrometer readings are sufficiently well known for the emissivity of metals and oxides but there is some uncertainty in the case of liquid slags. It is now deemed practical to determine the temperature of the charge of the bessemer converter by pyrometer methods. The operation of the open-hearth furnace can be gaged by the pyrometer; it is possible to control the temperature of the roof and of the bath of metal by observations taken through ports. Such a continuous and systematic control of open-hearth temperatures in steel and iron mills will undoubtedly make possible a greater certainty of uniformity of production.

Grinding Steel Mill Rolls

(*Concluded from page* 234)

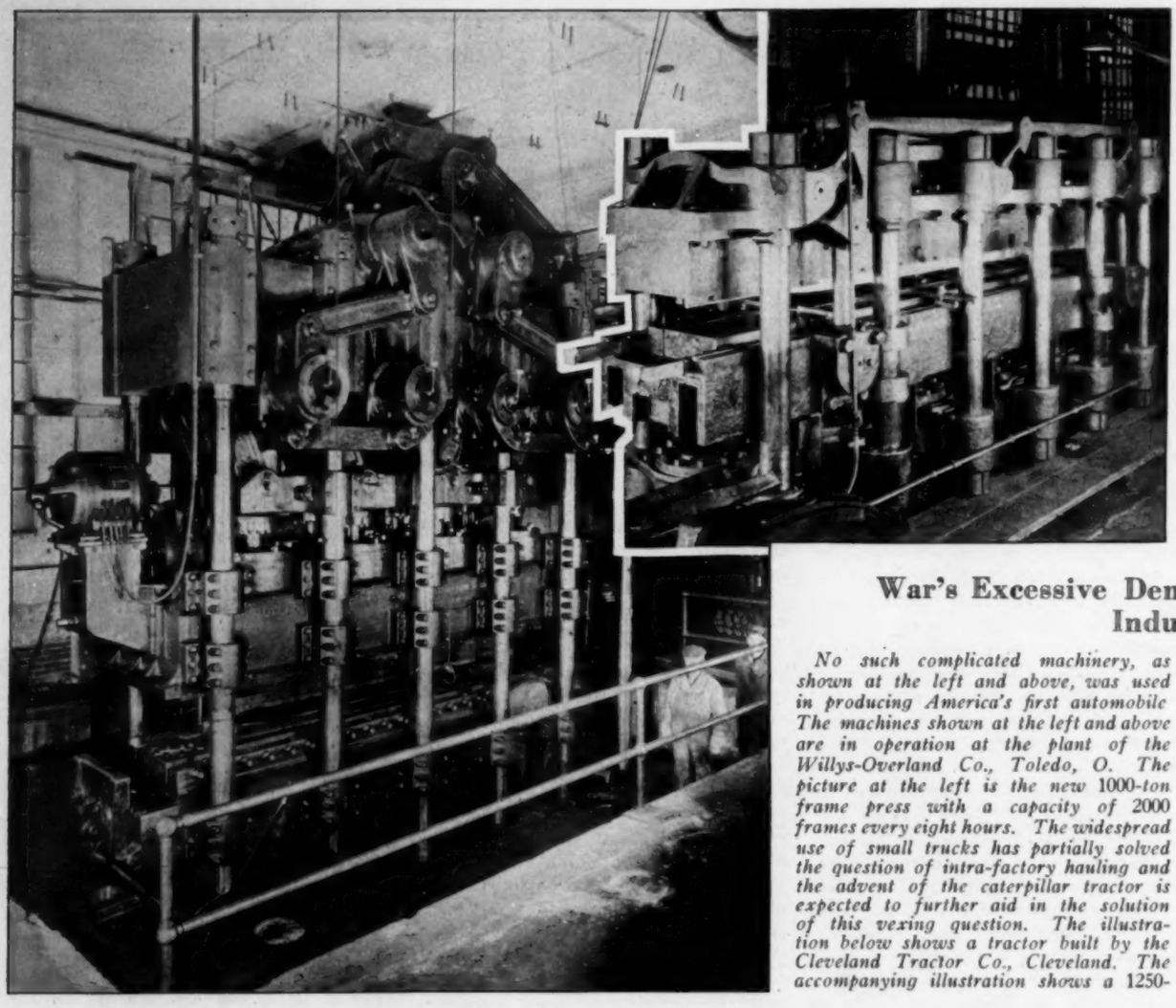
that the distance of travel for every revolution of the work is just slightly less than the width of the wheel in order to obtain the maximum production.

It is common practice in rub grinding rolls to remove as much as four cubic inches of material a minute. The wheel wear, of course, depends upon many things, such as the proper use of the wheel, material being ground, etc. The following are typical examples of relative wheel wear to metal removed, the finishing operation being included:

1. In removing 1802 cubic inches of stock on chilled iron rolls in 15½ hours, 167 cubic inches of wheel were worn from the diameter.
2. In removing 685 cubic inches of stock on chilled iron rolls in 8½ hours, 113 cubic inches of wheel were worn from the diameter.

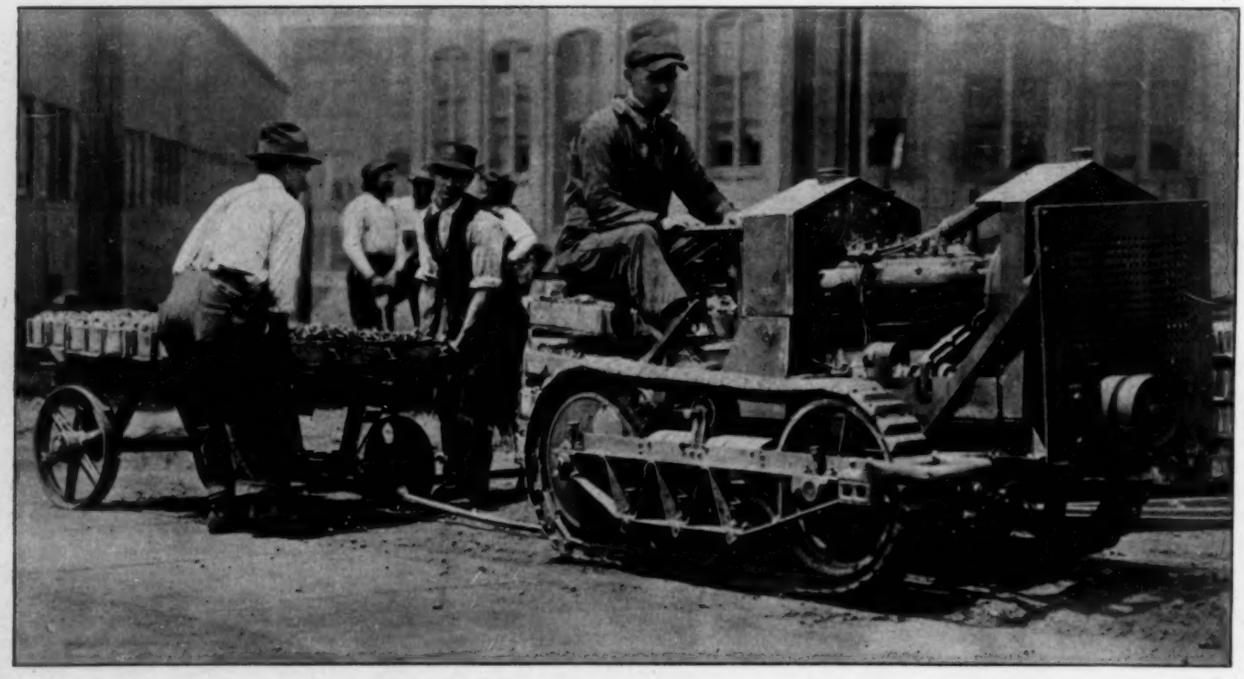
Formed Rolls

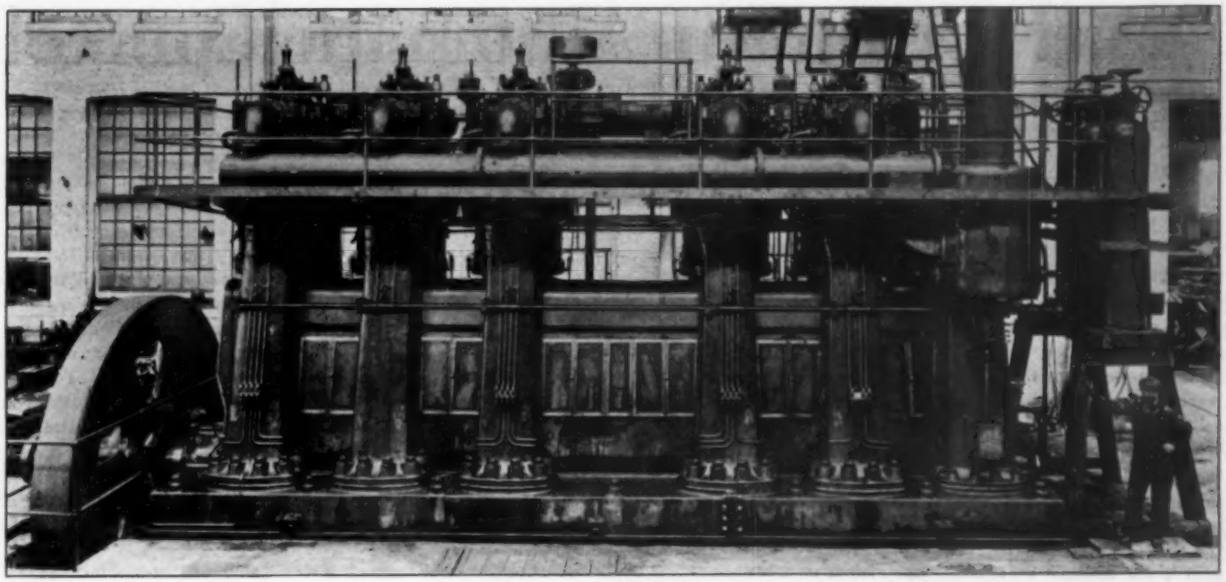
The forming of rolls is accomplished either by special attachments on the machine or by certain changes in the machine construction. It is possible to make a concave or a convex face on the roll. It is possible to taper the roll from one end or from both ends, or to grind the roll perfectly straight. Some work, especially rolling ribbon stock, requires that the face of the roll be crowned slightly. There are two methods of producing a crown on the small rolls and this is done either by forming the desired shape in the face of the wheel, then feeding the wheel straight in against the roll face, or by means of an attachment on the machine for controlling the movement of the wheel slide, so as to produce the desired shape as the wheel travels back and forth across the roll face. Tapers, or irregular forms of this nature are not very great as compared with the diameter of the roll. On small rolls for rolling ribbon stock, the crown may be from 0.001 inch to 0.015 inch high. On large diameter rolls, 36 inches in diameter and 90 inches long, the taper may amount to 1/16 inch in length of the roll face.



War's Excessive Demands Industrial

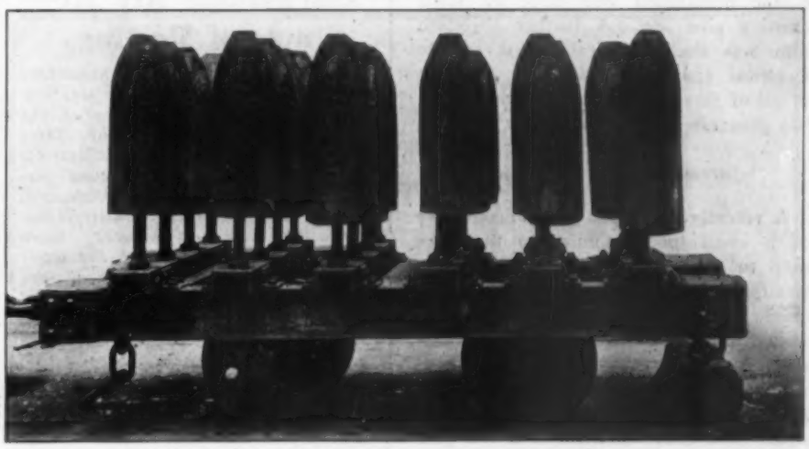
No such complicated machinery, as shown at the left and above, was used in producing America's first automobile The machines shown at the left and above are in operation at the plant of the Willys-Overland Co., Toledo, O. The picture at the left is the new 1000-ton frame press with a capacity of 2000 frames every eight hours. The widespread use of small trucks has partially solved the question of intra-factory hauling and the advent of the caterpillar tractor is expected to further aid in the solution of this vexing question. The illustration below shows a tractor built by the Cleveland Tractor Co., Cleveland. The accompanying illustration shows a 1250-

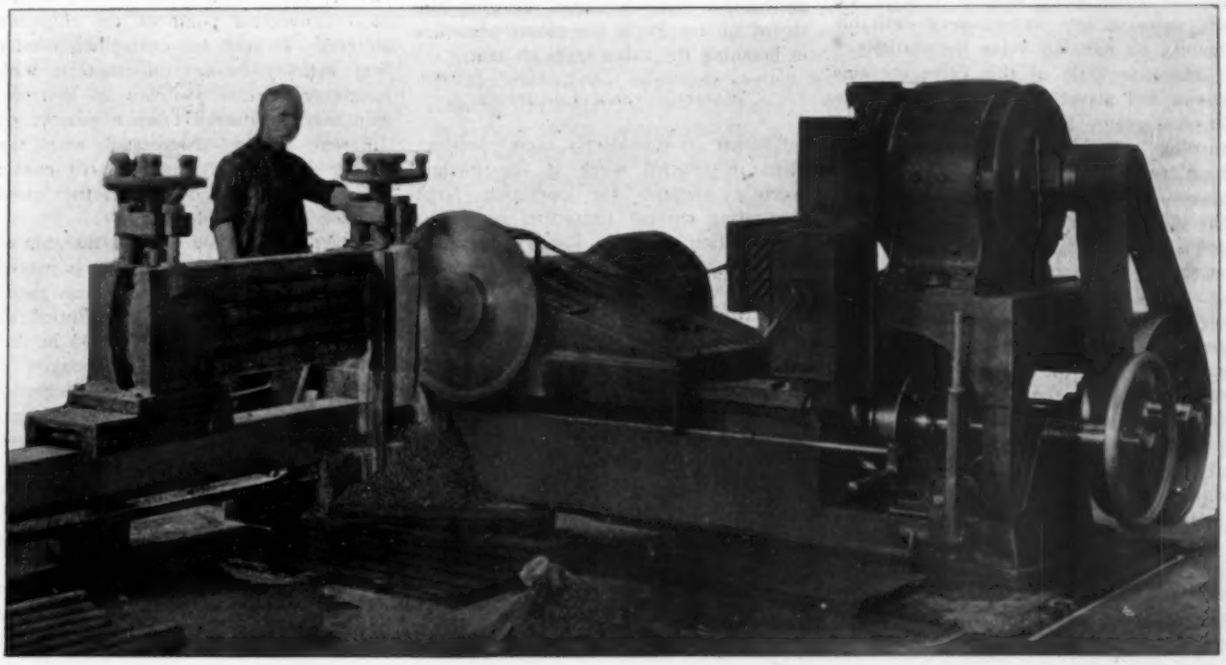




Stimulate Improvement of Equipment

brake-horsepower, 5-cylinder, 2-cycle diesel-type engine, similar to those used in pumping stations and factory power plants. The picture of this unit was taken on the erecting floor of the Nordberg Mfg. Co., Milwaukee. Robert Hadfield has developed a method of cooling large-diameter shell forgings in which a steel-framed car, shown in the accompanying illustration, mounts 24 spindles on which the heavy forgings are placed. The illustration at the bottom of this page shows the method of sawing in multiple steel rounds for high-explosive shells. The tool used for this work was developed by the Espen-Lucas Machine Works, Philadelphia, and is installed in the Canadian Vickars plant.





Developments in Automatic Control

While Many Engineers Believe Automatic Control is Over-Emphasized, Its Use in Industries is Spreading Rapidly as Improvements Steadily Increase Reliability and Ruggedness

BY F. P. TOWNSEND

THE satisfactory control of power-operated valves is a very important and difficult problem in and around large mills, power houses and pumping plants. Electric drive for large valves has, however, never been as successful in the past as it should have been, largely because of the difficulty of properly controlling the driving motor. Also because of the difficulty of applying the motor to the valve, since the motor was usually large, and the gear train difficult to connect up. Also, the valve usually had to be dismantled, if the installation was made on some existing pipe line. A further objection also was the considerable cost of the electrical apparatus. However, in spite of all of these objections, electrical drive has progressed somewhat.

Automatic Valve Operation

A recently developed drive makes use of a small motor similar to the ones used to start automobile engines. This small motor, which is a high-speed machine, possesses the advantage of light weight and low cost, and ease of mounting. It is mounted in a gear box, which contains the necessary reducing gears between the motor and the valve stem. The entire mechanism is self-contained and can be mounted as a unit on the valve yoke without dismantling the valve in any way—a very desirable feature on existing valve installations.

The gear train of this drive contains a sun and planet gear arrangement, the internal gear of which is prevented from turning by a mechanical trigger. So long as this trigger is engaged, the power of the motor will be transmitted through the gear train to the valve stem. At the end of the travel, just when the valve seats, this trigger is mechanically tripped. This allows the internal gear to spin free, thus in effect removing the fulcrum from the lever system. When the trigger trips, electrical power is at the same time shut off from the motor, which will finally drift to rest. The momentum of the armature of the motor, however, can not cause the valve to jam in its seat, since the fulcrum of the lever has been removed, and no further power is transmitted to the valve. This is one of the particular advantages of the system, since power can be applied to the valve right up to the point of seating, and then practically instantaneously shut off. This permits the valve to be easily opened without excessive power. No slowdown devices are necessary with this type of control.

Since the valve is never jammed on its seat, it is usually comparatively easy to release it. Should the valve be stuck in the seat, however, due to its having been closed for a long period, this drive will readily unseat it, because of the fact that, when it is desired to open the valve, the small motor is first brought up to speed, and then the mechanical latch engaged, utilizing the stored up energy in the motor armature in breaking the valve from its seat.

Discussions Are Keynote of Meeting

Discussions, always an important feature of an engineering meeting, were particularly interesting at the Philadelphia meeting of the Association of Iron and Steel Electrical Engineers. Among those who discussed the paper by Mr. Townsend, who is sales engineer, Cutler-Hammer Mfg. Co., Milwaukee; were F. D. Egan, president of the association, steam and electrical engineer, Pittsburgh Crucible Steel Co., Midland, Pa.; D. M. Petty, superintendent of the electrical department, Bethlehem Steel Co., South Bethlehem, Pa., and several others.

Motor-Operated Contactors

Another comparatively new development in control work is the method recently adopted for operating large alternating current contactors by means of induction motors. Large alternating current solenoids are difficult to build, and at best their operation is not nearly so satisfactory as direct-current magnets. A large oil-immersed alternating current contactor to handle 1000 amperes or so is a little too big to be operated by an alternating current magnet, and as alternating current operation of such contactors is highly desirable, a form of motor drive has been developed. The contactor mechanism is operated by means of a high-resistance induction motor, commonly known as a torque motor, through a pinion and a sector of a gear. As rapid movement of the contactor is desirable, the moving part of the motor is made quite light, and the pinion made large enough so that a small movement of the motor closes or opens the contactor. To close the contactor, power is applied to the torque motor. To open the contactor, power is shut off from this motor, and a spring opens the contactor contacts. The operation is precisely the same as the regular solenoid-operated switch, except that there is no shock or jar as the contacts are closed.

Improvements in Ship Steering

Another interesting development in automatic control is what appears to be a step backward; that is, the latest method of steering our naval ships by electricity. Just now this is a timely topic. In the past, electrical ship steering was arranged so that the rudder was made to automatically follow the movement of the steering wheel by means of a system of follow-up control, and in some cases by means of special motor-generator sets; and Ward-Leonard control. The latest installations of electric steering gear have been made very simple. The motor attached to the rudder is a plain direct current machine, which is provided with a plain reversing magnetic-type, automatic-acceleration controller. The controller is operated by means of a two-speed, reversible master switch; this switch being located in the most convenient point of the ship for steering. In fact, the controlling master may actually be several masters, with necessary selector switches so that the ship may be steered from a number of different points. Associated with the master is a rudder indicator to enable the steersman to determine the exact position of the rudder.

When it is desired to steer the ship to the right, the master controller is moved to the right, either to the low speed position or the high speed position as required, and the master is held in this position until the rudder occupies a position which gives the desired steering effect. After the rudder reaches this position, the master controller is centered and left so until it is desired to straighten out the course, whereupon the master is shifted to the left-hand position, and the rudder is centered or moved to any other position desired.

Considerable opposition on the part of the steersman was encountered on the first two or three installations, but as

they became accustomed to the new method they seemed to prefer it and did not care to go back to the old style of steering.

The speed adjustment of large alternating current motors is always an interesting problem, and it may be of interest to know that automatic control has been developed for one system of alternating current motor speed adjustment. This system is readily understood by reference to the accompanying illustration.

In this diagram, *M* represents the rolling mill motor; *RC* a rotary converter; *DCM* a direct-current motor which is mounted upon the same shaft as the induction motor, but which may be mounted upon the motor-generator set if desired; *A* represents a 3-pole contactor; *B* also a 3-pole contactor; *C* and *D* are each double-pole contactors, and *E* and *F* are field rheostats.

The main mill motor is an ordinary phase-wound rotor machine, and its secondary terminals are connected to two pieces of apparatus, first through contactor *A* to the ordinary starting resistor, through contactor *B* to the collector rings of a rotary-converter. There is mounted upon the same shaft with the induction motor the armature of a direct-current motor *DCM*. The armature terminals of this motor are connected to the direct-current terminals of the rotary-converter.

Starting the Motor

When it is desired to start this outfit, the primary switch of the induction motor is closed, and, since the contactor *A* is normally closed at this time, secondary current will flow through the starting resistor, which is provided with automatic switches for gradually reducing this resistance to zero. After this resistance has been removed from the circuit, the induction motor is up to normal speed. Now if it is desired to get some speed below normal on the mill, it is only necessary to close contactor *B* and open contactor *A*, whereupon the secondary current of the induction motor flows through the windings of the rotary-converter. This, however, will cause no appreciable change in the induction motor speed, since the field circuit of the rotary-converter and the direct-current motor are de-energized. To cause a reduction on the induction motor speed, it is only necessary to first energize the rotary-converter field by closing contactor *C*, and then energize the field of the direct-current motor by closing contactor *D*, with the resistance of the field rheostat *E* all in circuit.

Under the conditions outlined above, since the direct-current motor is mounted on the mill motor shaft, it is evident that with a small amount of field excitation in the direct-current motor that there will be a small amount of counter-electromotive-force developed on this motor, which will cause the rotary-converter to start to turn over and impress a frequency of its own on the secondary circuit of the induction motor. As this frequency increases, due to increased field strength of the direct-current machine, the induction motor secondary frequency must increase in order to stay in phase, which means that the induction motor must slow down, which it does.

With this arrangement, then, the amount of resistance inserted in the shunt field circuit of the direct-current motor will determine the speed of the entire set, this speed remaining constant under all load variations.

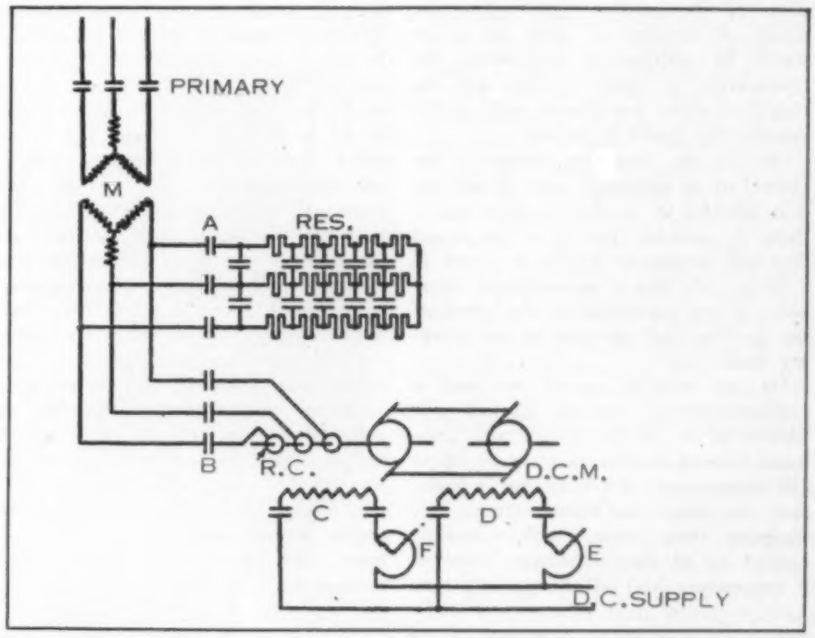
Automatic control has been developed to take care of this apparatus so that it is only necessary for the operator on such a mill to manipulate the usual master switch and the field rheostat of the direct-current motor. The field rheostat *F* on the rotary converter is only adjusted for power factor correction.

This system of mill drive has some advantages which apply to rolling mills, one of which is that it is a constant horsepower system when the direct-current motor is mounted on the mill motor shaft. With this arrangement the torque increases as the speed reduces; a very desirable effect for many drives. Another advantage of the system is that it may be installed after a mill has been put into operation, where it is found that lower speeds are desirable than were originally planned.

A better understanding of the desirability for first-class maintenance of automatic control apparatus seems essential. Up-to-date control equipments are very nearly fool-proof, as far as the operators of this apparatus are concerned. There is no question in my mind, however, but what such apparatus requires attention of experts for its proper inspection and maintenance. Undoubtedly it will operate without such extra attention, but it is my opinion that much more efficient results may be obtained where the upkeep of this type of apparatus is looked after very carefully.

There is a possibility in my mind of over-doing automatic control. Some mills specify automatic control for everything, regardless of the horsepower or nature of the drive. Other mills specify automatic control for all controllers above a certain horsepower rating, and again other engineers only specify automatic control where in their opinion they think it is justified. Automatic control is often installed where it is absolutely unnecessary, and further may be harmful. For instance, I can not quite see the necessity of having automatic control on a large rolling mill motor where an operator is always in attendance to start and stop the motor. It seems to me that automatic control in such a place is a needless complication, and only invites trouble, sooner or later, due to its necessary complication as compared with a simple manual control.

As an example of the opposite extreme, I would like to cite the case of the blast-furnace, skip-hoist control at the Krupp works in Germany. It is my understanding that all of these skip-hoists are controlled by drum type manually operated controllers, and naturally by trained operators. I do not



KRAEMER SYSTEM OF ALTERNATING-CURRENT MILL MOTOR CONTROL

mean that I would advocate that system for conditions in this country, but it shows a complicated device as a blast-furnace skip can be handled without automatic control. Most of the large electrically driven pumps and such apparatus are controlled by manual apparatus abroad, and while automatic methods may be advantageous where there are no operators present, it seems to me where operators are always at hand manual control should be very satisfactory if handled by intelligent and careful operators.

Favors Manual Control

BY F. D. EGAN

IN REFERENCE to control of steam valves I feel that the only application of steam will be through turbines in the power plants. In other words, we will not have steam engines in the mill proper unless it would be the use of the steam engines of the unaflow type, where the points of vacuum of about 24 inches would be satisfactory and where the temperature of water is high and the supply of water not always equal to the amount that would be needed.

One of the important things in the control of an automatic valve is not that it is actuated by an electric drive, but if there is occasion for it to be closed that you succeed in having it closed in a hurry. My idea of an automatic steam valve is one controlled by the speed of the machine and operated by the working fluid.

On our original cranes, we used a combination of manual control for motors up to 50 horsepower and automatic control on motors from 50 up to 150 horsepower. Later, on the installation of some additional cranes, we equipped these cranes with automatic control on all sizes of motors down to 5 horsepower and at the present time we are building some cranes on which we are going to reverse our last arrangement and intend using the manual control on the trolleys and bridges up to 50 horsepower similar to the arrangement we had on the cranes we first installed. One of the reasons for this is due, for instance, to a bridge drive on an outside crane of 30 to 50 horsepower. In winter time there is an increase in bearing friction, due to snow on the tracks, freezing of the oils, accumulation of ice around the bearings and in the gears. Due to these conditions, with an automatic controller, we find that the crane will not move when the controller is on the first point which has been adjusted in good weather. When the controller is pushed in the second or third point by the operator, if the crane then does not move, due to the relays locking out the switches, he generally gets around this point by introducing sticks or papers in the relays eliminating the automatic features and the advantages of the automatic control in the wear and tear of the crane. For this reason, on the bridge and trolley drives of the cranes we are purchasing at the present time, we intend using manual controllers up to 50 horsepower.

Practice Vindicates Control

BY D. M. PETTY

AS TO automatic control versus manual control, I am inclined to think that there are times when automatic control is unnecessary. When I say unnecessary, I mean taking all things into consideration. There are cases where automatic control is unnecessary from an electrical standpoint, but may be advisable from the standpoint of maintenance, etc. I also believe there are a few cases where manual control is actually superior to automatic control.

I have one operation in my mind, the operation of the bridge motion of a traveling crane. In my experience, in a few cases this has been successfully accomplished automatically, but in more cases it has not, due to the fact that the personal element of the operator is desired. On machine-tools, I feel that there are a number of reasons why automatic control should be used almost exclusively. In the first place, rapid production of material on a machine-tool is the primary object, and the construction of automatic control lends itself to a better layout for convenience of the machine-tool operator. This one point alone justifies automatic control in practically every case.

A 1500-horsepower mill using the system of induction-motor control outlined by Mr. Townsend is in use by the Bethlehem company, and has operated very satisfactorily. This mill has a particularly good record. The mill was connected to the motor, started up and set a very good tonnage record the first day. The second billet that passed through the mill was finished perfectly, the mill rolled continuously for eight hours without being shut down. This we claim is a very good record for any mill. This drive has speed control below synchronism only. The possibility of putting this apparatus up to a speed above synchronous speed involved considerably more than simple saying "push and pull"—in substance it amounts to taking energy from the line into the primary, and also taking energy from the line into the secondary. As I understand, theoretically and practically, it can be done very successfully either below or above synchronous speed, but right at synchronism a few complications enter into the problem that makes it rather difficult. This is due to a number of things all of which go back for their origin to the fact that at synchronism there is no voltage and current in the secondary of an induction motor. The amount of regulation that is desired determines the relative sizes of the machines. If we have, for instance, a case where the direct-current motor, as referred to on the diagram, is mounted on the same shaft as the primary motor, and the speed regulation is 50 per cent, the direct-current motor is half the capacity of the main drive motor, and having the same speed, its cost is determined by the relative cost of a direct-current, low-voltage motor and an alternating-current high-voltage motor.

One of the great advantages of this control for mills is the fact that at low speeds we have considerably more torque than at high speeds, in fact the horsepower is constant, or practically so. The torque at 100 revolutions per minute being unity, will be two at 50 revolutions per minute. This is just the condition wanted in the majority of mills.

There are other systems of control that give speed adjustments of induction motors—the Scherbius system, for instance. This is different from the Kraemer system inasmuch as a commutator alternating-current motor is used in place of the rotary-converter and direct-current motor. The disadvantages of either system as compared to the regular mill drive lie in the fact that you cannot get away from a commutator.

We have a large outfit of the Scherbius type being installed, 2000-horsepower capacity, which will run above synchronous speed as well as below. In this case we did not put the commutator motor on the mill shaft, but connected it to an induction motor or generator, depending on whether the main motor is running below or above synchronism. When the main motor is runing below synchronous speed, power is returned to the system, and when it runs above synchronism, power is taken from the system not only by the primary but also by the secondary of the main motor through the commutator motor set.

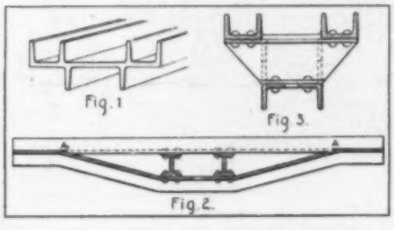
Designs Elevator Brake Magnet

A brake magnet, designed to insure quiet and reliable action of the friction brake of an elevator, has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This magnet, which is shown in the accompanying illustration, is designed for use with the parts regularly furnished by the elevator builder, and may be used for elevator motors operating on 220-volt, 440-volt and 550-volt, 25-cycle to 60-cycle, 2-phase and 3-phase circuits. The complete magnet weighs 70 pounds. It is mounted directly over the brake wheel as shown in the illustration, the base being bolted against the machined gear case.

When no current is flowing through the motor, the brakes are set, being held by a spring. When the motor is started, a portion of the current passes through the shunt magnet coils, energizing them and pulling down the brake armature. The travel of this armature which is about ¼-inch at the point farthest from the bearing, gives a horizontal motion of 1/16-inch to each of the lower ends of the bell-cranks, compressing the springs and releasing the brake. When the current fails or is cut off, the armature is released and the brake applied by the springs. The recoil of the magnet armature is taken up by buffer springs, which may be adjusted to the proper compression. The pull of the magnet is 150 pounds on the lower ends of each of the bell-cranks, making a total of 300 pounds compression available.

Bolster for Car Trucks

A bolster for railroad car wheel trucks was recently invented by Samuel A. Benner, Pittsburgh, which employs rolled sections almost exclusively in its construction. A rolled metal section, a perspective of which is shown in Fig 1, consisting of two channels, whose wide web is the base of a downwardly extending third channel, is the principal member of the bolster. This last named channel is sheared from the adjoining channels between the points AA, shown in Fig. 2. This part is forced downward and bent into shape by means of a hydraulic forcing press. When it is properly bent, two struts in the shape of I-beams are used to reinforce the entire body. The bolster body may be provided with the usual equipment of center plate and side bearings, as desired. Fig. 3 is a transverse section.



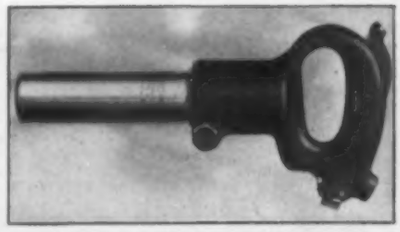
BOLSTER FOR CAR WHEEL TRUCKS

Redistribute Freight Cars

To relieve the acute shortage of railroad cars, which has been prevalent in various sections of the country, the railroads' war board recently ordered the movement of empty freight cars

BRAKE MAGNET SHOWING METHOD OF INSTALLING

from one road to another, regardless of ownership. By this policy, which is new to American railroad usage, the board hopes to solve the problem of rapidly mobilizing in different sections of the country the freight cars necessary to handle the abnormal government and commercial traffic that war conditions have produced. Reports to the war board from the car service commission show that orders have been given to 36 separate railroads to ship immediately 68,814 freight cars to 54 other railroads. These cars are being moved without load and in the quickest possible time. The reports show further that 46,682 cars actually have been received by the roads for whose benefit this arbitrary movement is ordered, and that 51,795 cars already have been delivered by the initial roads to intermediate lines in the direction of ultimate destination. Among the immediate important results of this redistribution of cars will be increased facilities for the prompt shipment of lumber from southern points to the army cantonment sites and wooden shipbuilding yards. The redistribution also is expected to assist materially in the transportation of grain from the middle west to the east. Beneficial results so far have been obtained in the shipment of livestock and potatoes and other produce from Texas and the southeast. Of the cars being redistributed there are 19,000 coming from the Pennsylvania system, more than 9000 from the New York Central, 5692 from the Boston & Maine, and 4900 from the Baltimore & Ohio.



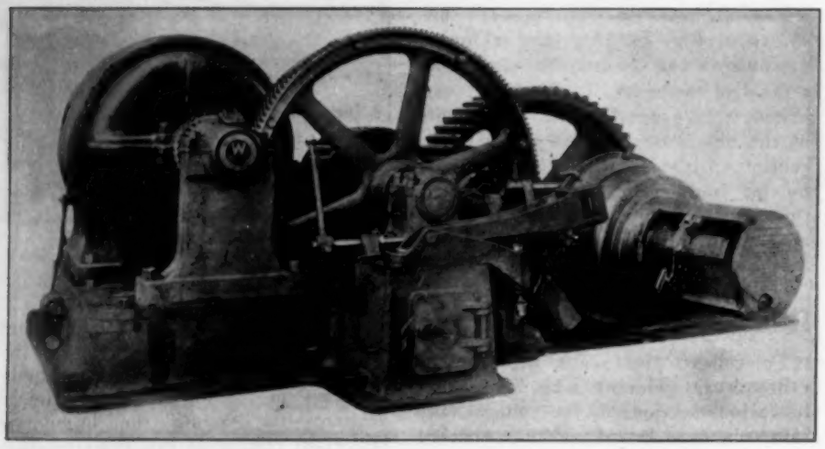
PNEUMATIC HAMMER MADE BY DAYTON PNEUMATIC TOOL CO.

New Pneumatic Hammer

A new type of pneumatic hammer especially adapted for chipping all kinds of castings, steel billets, boiler plates and structural iron, and for calking and beading, has been developed by the Dayton Pneumatic Tool Co., Dayton, O. This hammer has long bearing surfaces which are said to increase the life of the tool almost one-half. The hammer contains only 12 parts, all simply designed. The hammer illustrated is adapted for medium chipping, calking and beading. It weighs 12½ pounds and is 13⅜ inches long. Five other types are built to handle lighter or heavier work.

Builds Standardized Bus Supports

Standardized bus-bar, bus-wire and bus-tube supports to meet a wide range of requirements have recently been developed by the General Electric Co., Schenectady, N. Y. The insulators are divided into two classes, one for use up to 3500 volts and the other from that up to 16,500 volts. Interchangeable iron caps are fastened permanently to each end of the insulators. The construction of each fitting fastened to the bottom of the insulator is such that the insulator can be turned through an arc of 90



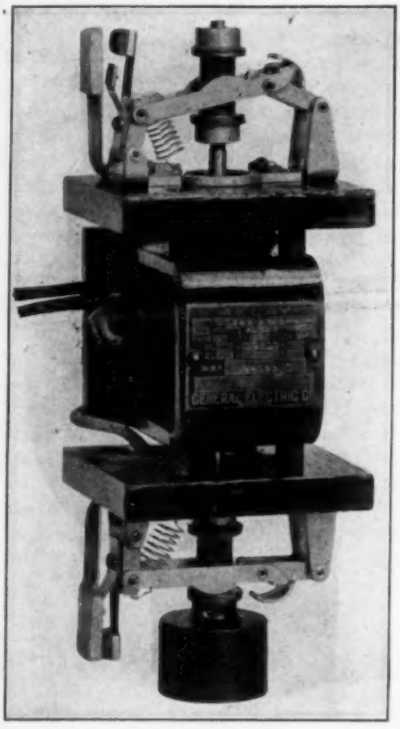
TWO-BLOCK, HORIZONTAL-SPINDLE BULL FRAME

degrees parallel to its base and locked in any desired position by the holding bolts.

Ventilation is obtained by spaces between the bus lamination. When these spaces are not provided by the connection bars from breakers or switches, spacers are inserted between the bus laminations.

Develops Trip-Free Relay

To prevent electrically operated breakers from being held closed on overload, the General Electric Co., Schenectady, N. Y., has developed a trip-free relay shown in the accompanying illustration. If the breaker is closed when there is an overload on the line, the overload relay energizes the lower coil of the trip-free relay and the plunger, which operates both sets of contacts, is raised. The opening of the upper contacts disconnects the closing coil of the motor-operated breaker. At the same time, the breaker opens and remains so until the control switch is opened. When the trip-free relay coils are not energized the contacts fall by gravity into the normal operating position. These relays are mounted usually near the breakers or behind the switchboard.



TRIP-FREE RELAY

Sand Tempering Machine

In the operation of a continuous foundry, it is necessary to give the problem of keeping the sand in proper condition careful attention. In some cases it has been found the sand has a tendency to form small hard balls which impart rough surfaces to the castings. In other foundries it has been found that the sand gets so hot that the molds dry out before they are poured. In an effort to overcome these difficulties, the Link-Belt Co., Chicago, has designed a new machine which is known as a molding sand revivifier. The principal element of the machine is a horizontal shaft on which beater arms, made of flat bars, are mounted. These arms are set at opposing angles so that the sand delivered to one side of the machine is thrown diagonally across to the other side, thus receiving a thorough mixing and aerating. The main shaft runs at 800 revolutions per minute and it is claimed that sand balls and hard lumps are promptly broken up by the beater arms.

The beater throws the sand against a curtain of hinged rods which prevents the air from swirling around inside the shell of the machine and carrying the sand with it. The whole shell is pivoted at the rear and is so suspended that it is lifted a distance of 1½ inches about 30 times a minute by a cam. The cam drops the shell on a block of wood and the shock causes the shell and rods to vibrate, with the result that particles of sand that ordinarily would adhere to the mechanism are shaken off. It is claimed, therefore, that the machine is always clean and in condition to do effective work. Also it is stated the usual increase in the temperature of the sand incident to pouring is reduced at least 50 per cent by passing the material through this machine.

Builds Motor-Driven Bull Frame

For drawing wire from 7/16-inch to 1-inch diameter, a 2-block horizontal spindle bull frame shown in the accompanying illustration has been built by the Morgan Construction Co., Worcester, Mass. This machine will handle square, hexagonal and round sections, with a pull at the die of from 10,000 pounds to 20,000 pounds. A special feature of this machine is a winding block so arranged that while the pull is always close to the main bearing, the coiled wire moves out

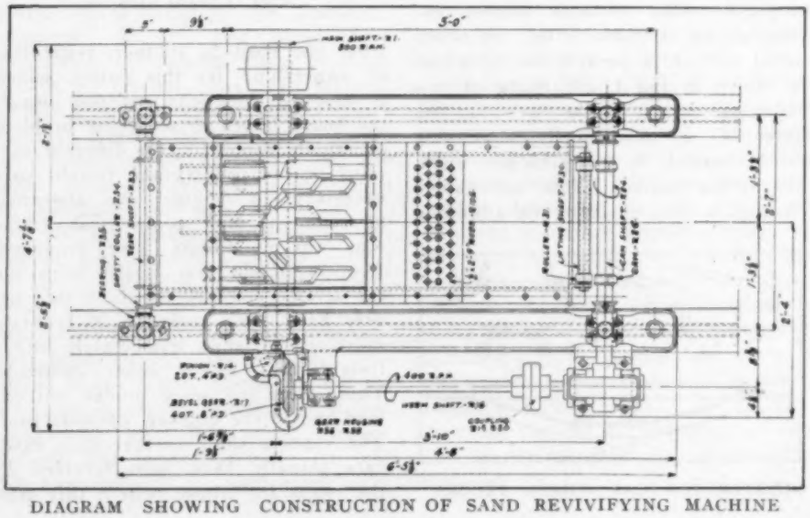
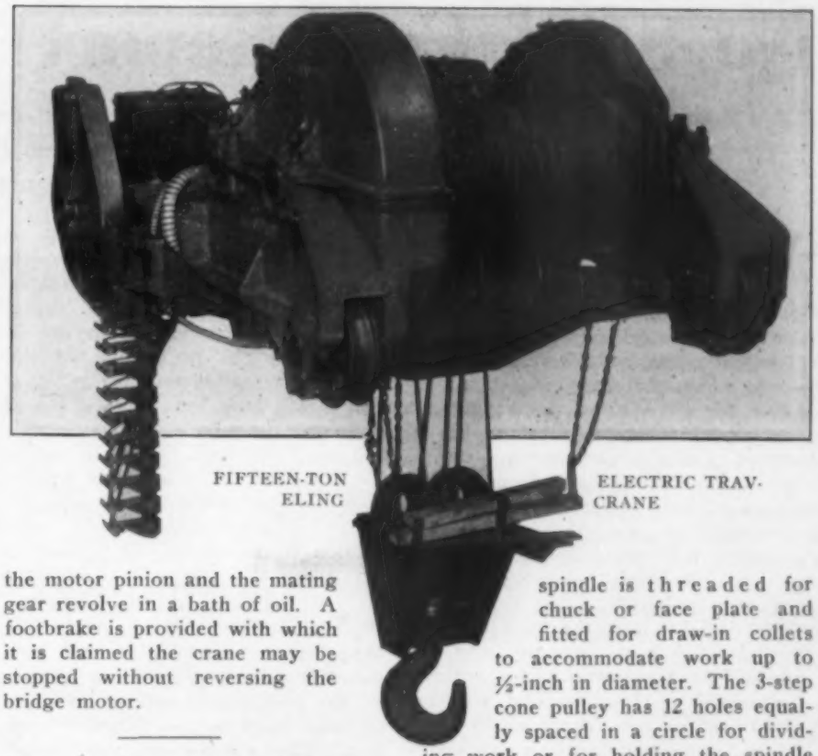


DIAGRAM SHOWING CONSTRUCTION OF SAND REVIVIFYING MACHINE

to the end of the block in a regular helix without bunching or crowding. In addition to the safety afforded by quick stopping, characteristic of individual drive, a friction clutch is contained in each block which instantly disengages the block from the mechanism. By the movement of the clutch lever, the drawing may be stopped at any time regardless of the strain on the block. This tool, which is intended for heavy work at high speeds, is equipped with a 150-horsepower induction motor made by the Westinghouse Electric & Mfg. Co., East Pittsburgh. Other sizes of this tool are driven by smaller motors.

Builds 15-Ton Crane

The Champion Crane Co., Guardian building, Cleveland, has recently developed the 15-ton hoisting equipment shown in the accompanying illustration. This crane, which is designed to carry either direct current or alternating current motors of any standard type, is provided with a number of automatic safety devices. The hoist mechanism is provided with an automatic switch limiting the upper travel of the hook, while the trolley is designed to permit installation of any standard safety device. The side frames of the machine consist of one-piece castings connected by a steel separator. This separator carries the hoisting motor. All shafts in the hoisting mechanism are located in a horizontal plane and due to this construction any shaft with its pinions may be lifted without disturbing other parts. The bridge motor is located near the center of the span and is attached to the front girder. The bridge motor pinion engages the driving gear on the cross shaft midway between the truck wheels and both the motor pinion and the mating gear revolve in a bath of oil. A footbrake is provided with which it is claimed the crane may be stopped without reversing the bridge motor.

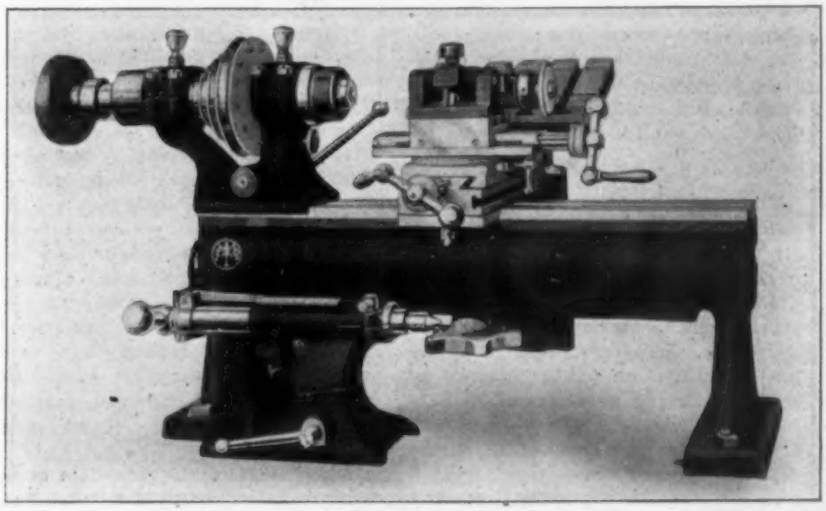


FIFTEEN-TON ELECTRIC TRAVELING CRANE

Brings Out Portable Precision Tool

A combination grinder and precision lathe has recently been developed by the Ideal Machine & Tool Co., 128 Opera place, Cincinnati. The machine has swing of 7 inches and is made with different lengths of bed, the shortest giving a distance of 12 inches between centers. A compound slide rest with stop is used which will give a longitudinal feed of 3 inches at one setting. The cross feed has a maximum movement of 3 inches. Both feed screws and the tailstock are fitted with micrometer dials. The spindle is threaded for chuck or face plate and fitted for draw-in collets to accommodate work up to ½-inch in diameter. The 3-step cone pulley has 12 holes equally spaced in a circle for dividing work or for holding the spindle while tightening collets.

A 4 x 6-inch table provided with T-slots and adjustable to any angle is mounted on a bracket at the rear. The bracket is held in position by a T-head bolt which slides in a slot extending the full length of the bed. This table is used for holding work while performing various surface grinding operations. Both the headstock and the tailstock can be removed while grinding without loosening bolts or screws. A toolpost is provided accommodating tools up to 5/16 x ½-inch. The machine, countershaft and motor can be mounted on a wood base thus making a portable outfit.



GRINDER AND PRECISION LATHE

Chemical Engineers Meet in September

The American Chemical society will hold its September meeting in the new building of the Massachusetts Institute of Technology, Charles river road, Cambridge, Mass., Sept. 11, 12 and 13. The Northeastern section has been requested by the directors to arrange a program bearing as fully as possible on questions concerning the activities of chemists, both in the government service and in the industries affected by the war. Society headquarters will be at the Hotel Lennox. The final and complete program will be announced about Sept. 5. The division of industrial chemists and chemical engineers will meet Wednesday, Sept. 12.

No Steel Cost Report For Months

Federal Trade Commission Making Slow Progress in Compiling Endless Data From Books of Individual Manufacturers—Government Policy in Case of Coal Outlined—Propose Congressional Action Against Abnormal Prices

WASHINGTON, July 31.—Slow progress is being made by the federal trade commission in its investigation into present costs in the iron and steel industry. Shortage of expert accountants is retarding the work, while the many investigations which the commission is carrying on contemporaneously also is proving a barrier to determining steel costs rapidly. While much depends upon the nature of the investigation—whether thorough or not—several months probably will be consumed in the investigation instead of the few weeks originally predicted.

An insight into the commission's attitude in cost investigations is afforded by a summary of its work in determining costs in the coal industry, given out a few days ago. "The report," according to the commission, "that will be sent to the President will be based on careful cost determination of wages, maintenance, overhead and material charges. Depreciation is carefully considered, as are investment and other factors. Due attention is being paid to the primary factor of maintenance of maximum production.

Will Study Many Reports

"The work entails careful study of many sets of books and inspection at the mines frequently of special factors bearing on costs. As the reports come to the commission, the information is correlated and each report is carefully analyzed and checked up. All apparent exceptions are investigated. The result will be that when the report is sent to the President it will have been done with such complete thoroughness that a 'fair and just' price can be determined on the basis of the cost determination. It is the cost determination only, not the price determination, that the commission is concerned with."

The work on investigating costs in the coal industry is progressing rapidly, according to this authorized summary of the commission. A large corps of expert accountants is busy on the tremendous task of ascertaining coal costs in the different localities. The commission also is endeavoring to exercise a closer control over the anthracite coal industry. This work, according to the commission, is being undertaken to insure that consumers get anthracite coal at moderate prices. Operators are being required to report weekly on all orders.

At the same time the commission is making what it calls the "first broad, thorough and comprehensive investigation of a constructive character embracing all phases and angles and ramifications of the meat and packing industry." This work is requiring the services of a large force. The commission has just completed an investigation into the reasons for the increased costs of flags, with the result that congressional action is urged to protect the public against "extortionate" and "indefensible" prices, which it is alleged are being charged for some commodities.

Claims Prices are Unreasonable

"The public and the industries," according to the commission's report, "are not protected against sudden, unreasonable and extortionate prices. Competition in selling has been practically suspended and prices are made not merely to yield fair and generous profits based on producing and distributing costs, but are sent to an indefensibly high level made possible by the great demand and with only normal supply.

"The commission suggests consideration by congress of immediate legislation adequate to afford prompt relief generally to the public and the industries in war times against unreasonable prices, not only when such prices result from unlawful agencies, but also where they arise merely out of abnormal conditions in which an abandonment of the public to an unchecked working of supply and demand must result in extreme hardship and inequity."

Heavy Call Upon Steel Makers For Guns

WASHINGTON, July 31. — While only the bare outline of the emergency requirements of the war department has been furnished the senate, this is sufficient to indicate that the iron and steel industry is to be called upon to furnish supplies in a heavier volume than had been generally appreciated. Most of the items listed in the estimate, which aggregates $5,000,000,000, will require iron and steel in some form or another.

By far the most important is the estimate of $2,468,613,000 for "armament of fortifications". While at first this was taken to mean an expenditure to take care of a comprehensive plan for improving the country's coast defenses, later information reveals that the money is sought to provide artillery for our forces abroad. An expenditure of nearly two and one-half billions for artillery will inevitably place a huge burden upon steel producers. The exact details of the war department's plans are not available.

Won't Depend on French Guns

The plan to spend nearly one-half of the $5,000,000,000 asked for, on artillery is a direct refutation of a report issued a few days earlier that French gun factories would be relied upon to furnish artillery for our troops in Europe. This report was issued by the committee on public information and bore every evidence of authenticity, but when the attention of war department officials was called to the discrepancy, they denied that any such plan had ever been contemplated. The report had stated that our present supplies of artillery would be used for training purposes, and that the guns, when relined, would be changed over to French caliber. All shells and guns, from that time on, were to be made to French standards.

The sum sought will be sufficient, it is thought, to bring our artillery supplies, which are now entirely inadequate, up to the overwhelming strength needed in modern warfare. The immensity of the task is appreciated when it is recalled that the steel mills and gun factories must supply sufficient artillery in a comparatively short time to match that which England, France and Germany have been accumulating for many years.

Other items in the war department estimate, all of which will require the furnishing of steel, include auto machine rifles, $170,277,000; ordnance

stores, ammuntion, $39,520,000; ordnance stores and supplies, $70,000,000; armored motor cars, $21,750,000; submarine mines, $700,000; protecting Panama canal and canal structures, $692,900; submarine base, canal zone, $902,625; water and sewers at military posts, $34,327,500. The Frankford arsenal, Philadelphia, will require $2,630,000; the Benecia arsenal, Benecia, Cal., $91,500; Springfield arsenal, Springfield, Mass., $445,000; Watertown arsenal, Watertown, Mass., $741,500; Watervliet arsenal, West Troy, N. Y., $789,500; Rock Island arsenal, Rock Island, Ill., $1,645,200; Picatinny arsenal, Dover, N. J., $40,000; San Antonio arsenal, San Antonio, Tex., $185,000. Terminal facilities will require $25,000,000; storage facilities at armories and arsenals, $500,000; testing machines, $10,000; and the ordnance depot at the Panama canal, $59,700.

War Purchasing Power is Centralized

WASHINGTON, July 31.—The absence of a responsible agency with which manufacturers anxious to furnish government supplies could deal direct has been corrected by the formation of the new war industries board and the central purchasing committee. The duties of the council of national defense were so heavy and its size necessarily so cumbersome, that considerable confusion arose in distributing orders. At the same time many governmental departments were buying direct, so that a manufacturer was forced to deal with many agencies instead of with one responsible body. The new board and purchasing committee will discharge only duties carried now by the council of national defense, but its formation is a long step toward the organization of a single buying agency for supplying all federal needs.

The work of the board will be similar to that of a purchasing agent for a large corporation. The various departments of the council of national defense will continue to determine the supplies they need, and will forward their estimates to the board. In this way the buying can be centrally grouped and the board will have accurate knowledge at all times of the total amount of supplies required.

The formation of the board will not curtail the activities of the council of national defense. An official announcement states that "the council of national defense and the advisory commission will continue unchanged, and will discharge the duties imposed upon them by law."

The organization of the board meets the criticisms which have been leveled by some legislators against some manufacturers serving on committees whose duties indirectly dealt with the purchase of products made by these business men. "The purpose of this action," says the announcement reporting the board's formation, "is to expedite the work of the government, to furnish needed assistance to the departments engaged in making war purchases, to devote clearly and definitely the important tasks indicated upon direct representatives of the government not interested in commercial and industrial activities with which they will be called upon to deal, and to make clear that there is total disassociation of industrial committees from the actual arrangement of purchases on behalf of the government. It will lodge responsibility for effective action as definitely as is possible under existing laws. It does not minimize nor dispense with the splendid service which representatives of industry and labor have so unselfishly placed at the disposal of the government."

War Industries Board

Members

Frank A. Scott, vice president, Warner & Swasey Co., Cleveland, chairman.

Bernard M. Baruch, chairman of committee on raw materials.

Robert Brookings, St. Louis merchant.

Robert S. Lovett, chairman, Union Pacific railroad.

Hugh Frayne, chief organizer, American Federation of Labor, New York.

Rear Admiral Frank F. Fletcher.

Lieut. Col. Palmer E. Pierce.

Purchasing Committee

Mr. Baruch,
Mr. Brookings,
Mr. Lovett,
Herbert S. Hoover,
food administrator.

No announcement of policy has been made regarding the handling of purchases for the allies through the war board. Close co-operation between this government and the allies in securing supplies is assured, however, in order to avoid any possibility of the two groups of buyers working at cross purposes.

Promoting Efficiency of New Export Council

Washington, July 31.—The licensing work of the exports council is being promoted by the formation of additional divisions to handle the problems involved. A new division to be known as the war trade statistical division has been formed with Prof. A. A. Young, formerly of Cornell university, at the head. This division will make a special study of the effect of war conditions on our foreign trade in order to advise the men in charge of the issuance of licenses. A war trade intelligence section also has been added with Paul Fuller, formerly of Coudert Bros., at the head. His section will maintain a force abroad to trace the course of American exports. Several other minor sections have been organized.

A successor to Edward N. Hurley on the administrative board of the exports council will be named shortly. The members of this administrative board now are Vance McCormick, of the state department; Dr. Alonzo E. Taylor, of the department of agriculture; and John B. White, representing the food administration. The exports council itself consists of Secretaries Lansing, Houston and Redfield and Herbert C. Hoover, government food administrator. The secretary of commerce through the bureau of foreign and domestic commerce handles the details of putting the export ban into effect. A new division of this bureau, the division of export licenses, was organized, with C. A. Richards, a volunteer war worker, at the head, and the new divisions supplement the work of these main agencies.

Defines Rivet Carload

Washington, July 31.—The interstate commerce commission has approved the minimum carload weight of 80,000 pounds now applied on rivets shipped from Pittsburgh to Seattle. The decision arose from a complaint filed by the Garland Nut & Rivet Co., Pittsburgh. The decision recalls that prior to July 15, 1915, the minimum on rivets, bolts, nuts, washers, nutlocks, lag bolts, and lag screws, in straight or mixed carloads, from Pittsburgh to Seattle, was 40,000 pounds. On that date it was increased to 80,000 pounds. The carload rate was then reduced from 80 cents per 100 pounds to 75 cents; a few months later to 65 cents and in December, 1916, was increased to 75 cents, the present rate.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

FRANK C. OSBORN has been elected president of the Osborn Engineering Co., Cleveland. Mr. Osborn will return to active service in the company which he founded after an absence of several years. Other officers of the company recently chosen are as follows: Vice president and general manager, B. L. Green; secretary, P. P. Evans, and treasurer, L. G. Middough.

John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass., has reached Paris.

E. H. Gary, chairman of the United States Steel Corp., left New York, Aug. 2, on a several weeks' trip to Alaska.

E. Lyman Button has become credit manager of the Trumbull Steel Co., preliminary to being named assistant treasurer of the company.

H. H. Henry has been placed in charge of the safety department recently established by the A. M. Byers Co. at its Girard, O., plant.

James W. Armour, secretary of the Armour's Pattern Shop Co., Worcester, Mass., has been appointed a first lieutenant in the ordnance department of the United States army.

W. S. Jones, of Philadelphia, who has been associated with the Midvale Steel Co. in its general sales department, has been chosen vice president of the Vanadium Alloys Co. of Pittsburgh and Latrobe, Pa.

Harry S. Pope, formerly of the New York office of Luria Bros., has been appointed New York manager for John J. Caine, scrap iron and steel dealer, Philadelphia. Mr. Pope succeeds Peter J. Becker who recently resigned.

O. P. Ludwig, of Birmingham, Ala., has been named general manager of the reorganized Dayton Coal & Iron Co., Dayton, Tenn., and now is in active charge of the reconstruction work at the plant.

Setrak K. Boyajian, Worcester, Mass., consulting chemist and metallurgist, has been appointed a first lieutenant in the ordnance department of the officers' reserve corps of the United States army.

J. R. Kilbourne, general manager of the Kilbourne-Jacobs Mfg. Co., is a member of one of the Ohio appeal boards appointed to act on applications for exemption for military draft.

O. B. Newton has been appointed general sales agent of the Virginia Iron, Coal & Coke Co., with offices at Roanoke, Va., succeeding C. W. Owen, who recently resigned to engage in other business. The change is effective Aug. 1.

T. J. Ray, who has been assistant manager of the Cleveland plant of the Peck, Stowe & Wilcox Co., Southington, Conn., maker of hardware, has been elected a director of the company succeeding W. R. Wakeley, who resigned because of ill health.

Robert Ball, manager of the Butterworth & Lowe foundry of Grand Rapids was elected secretary of a new organization of foundrymen of western and southern Michigan, formed at the Hotel Pantlind, Grand Rapids, Mich., this week.

George F. Fuller, president of the Wyman-Gordon Co., Worcester, Mass., and Cleveland, has been recognized for his public service in the Liberty bond and Red Cross campaigns by having the camp of B and E batteries, 2d Massachusetts artillery, N. G. in Worcester named for him.

J. W. Kelly, for eight years purchasing agent of the Riter-Conley Mfg. Co., Leetsdale, Pa., has resigned to open offices in the Second National Bank building, Pittsburgh, as manufacturers' agent. He is representing the Mahoning Foundry Co., Punxsutawney, Pa., producers of gray iron, brass and bronze castings.

William H. Hart, for many years until his retirement in February, 1915, president of the Stanley Works, New Britain, Conn., quietly observed his eighty-third birthday at his summer home in Oak Bluffs, Mass., July 25. Mr. Hart is chairman of the board of directors of the company.

J. H. Jowett, formerly general sales manager of the Ingersoll-Rand Co., New York, has been elected vice president of the company. L. D. Albin, for some time past assistant general sales manager, has been chosen to succeed Mr. Jowett. Mr. Jowett and Mr. Albin will continue to make their headquarters at the company's New York office, 11 Broadway, New York.

William C. Aldrich, formerly superintendent of the Penn Steel & Iron Co., Lancaster, Pa., has been made assistant general manager. J. O. B. Dellet has been made secretary to succeed J. Hale Steinman, now in the federal service. W. F. Barry, formerly with the Portland Rolling Mill Co., Portland, Me., has been made superintendent.

Merrill G. Baker, assistant general manager of sales, American Vanadium Co., 120 Broadway, New York, has received a commission as captain in the ordnance department of the United States army, and was ordered to report to the chief of the ordnance department at Washington, Aug. 1, for active duty.

B. F. Repton has been chosen controller with full charge of the accounting work of the Canadian Car & Foundry Co., and its subsidiaries. Mr. Repton formerly was associated with Price, Waterhouse & Co., New York, for 10 years, and later held the position of general auditor of the Dominion Steel Corp.

E. F. Entswile, formerly mechanical engineer of the Bethlehem Steel Co., Steelton, Pa., now is general superintendent of the Donaghmore plant at Lebanon, having succeeded W. L. Wolf, resigned. Frank E. Howells has succeeded Mr. Entswile as mechanical engineer of the Steelton plant.

Prof. Lionel S. Marks, Cambridge, Mass., head of the combined departments of mechanical engineering of Harvard university and the Massachusetts Institute of Technology, has been secured to take charge of investigations relating to airplane engine design being conducted by the national advisory committee for aeronautics at the bureau of standards, Washington.

Alfred L. Holmes has been appointed district sales agent at Cleveland, and C. M. Goldman has been given a similar position at Philadelphia, for the Pangborn Corp., Hagerstown, Md., sand-blast equipment. Mr. Holmes formerly was with the same corporation for six years, while Mr. Goldman has been representing the Obermayer Co. in

Philadelphia territory for some time past.

Dr. Ira N. Hollis, president of the Worcester Polytechnic Institute, Worcester, Mass., and president of the American Society of Mechanical Engineers, has been appointed by President Wilson a member of division No. 6 of the Massachusetts district board of review, authorized under the selective service law. Clinton S. Marshall, Worcester, Mass., district manager of the American Steel & Wire Co., was appointed a member of division No. 1.

Myron C. Kline, formerly sales manager of the Jacobson Machine Mfg. Co., Warren, Pa., has been engaged as general manager by the Termaat & Monahan Mfg. Co., Oshkosh, Wis., manufacturer of marine and stationary engines, lathes and other machinery. The company has recently taken over the Termaat & Monahan Co., which went into the hands of a receiver last fall, but was reorganized.

J. G. Hershey, for the last three years identified with Max Solomon, Pittsburgh, iron and steel scrap dealer, has resigned to become connected with the Acme Tube Co., Oliver building, that city, distributor of hot and cold drawn seamless steel tubing, mild lap welded iron and steel boiler tubes and mechanical tubing. The Acme company represents the Elyria Iron & Steel Co., Elyria, O., in Pennsylvania in the sale of light gage welded and cold rolled steel sheets.

Theodore Swann, general sales manager of the Alabama Power Co., has resigned and David H. Cronheim, for many years associated with Mr. Swann, has been selected to succeed him. Mr. Swann resigned in order to be able to give more of his attention to his duties as president of the Southern Manganese Co., Anniston, Ala., and further, to assist the Anniston Steel Co. and the Anniston Ordnance Co., subsidiaries of the Alabama Power Co.

Ira J. Francis has been chosen Pacific coast sales agent of the John A. Roebling's Sons Co. of California, with headquarters at 646 Folsom street, San Francisco, having been made chief of the Pacific Coast sales organization after 16 years of service as manager of the Los Angeles branch of the company. J. N. Colkitt succeeds Mr. Francis as Los Angeles manager. S. W. Gilman, for some time assistant manager of the San Francisco branch, has been made manager of that store.

Sales of wire manufactures to Russia by the United States were $5,374,000 in 1916 against $8,800,000 in 1915.

Sheet Plant

To Be Built by Canadian Company—Open Alberta Manganese Deposit

Toronto, July 30.—The Steel Company of Canada has purchased from the city of Hamilton, Ont., a site of 1.76 acres, upon which it has commenced the erection of a sheet steel plant, which when in operation will supply the Canadian demand for sheet steel. A small plant now located at Wallaceburg, Ont., will be removed to Hamilton, and it is proposed to ultimately extend the industry to include the production of steel plate for shipbuilding.

H. N. Cole, company engineer of the Semet-Solvay Co., Syracuse, N. Y., has been in Hamilton, Ont., making a survey of property in connection with a project for establishing a $2,000,000 coke-gas plant. Should this project be carried out, the Semet-Solvay Co. will co-operate with the Hamilton By-Products Coke-Ovens, Ltd. It is proposed that the enterprise shall be financed by the local company and operated by the Semet-Solvay Co. About 1200 tons of coal would be consumed daily and 7,000,000 feet of gas produced daily.

Extensive deposits of manganese ore have been discovered in the Cypress Hills in southeastern Alberta and are being worked by James F. Reilly of Montreal, who is understood to represent the Hersey and allied interests of that city. It is stated that during the last few months a heavy tonnage has been blocked out from the surface. The output is being sold to the British government for war purposes at $68 per ton. The known manganese area was secured by the operators before the discovery was generally known, but it is thought not unlikely that the deposit may extend from the Cypress Hills down to the Sweete Grass hills in Montana.

The output of the Nova Scotia Steel & Coal Co. for the months of April, May and June in tons was: Coal, 152,076; ore, 4238; limestone, 20,890; coke, 25,874; pig iron, 21,971; steel ingots, 33,377, and finished steel and forgings, 28,904.

Form Ambulance Corps

An ambulance corps, to be known as the "Armco Ambulance Corps", composed entirely of employes of the American Rolling Mills Co., Middletown, O., and furnished with special ambulances and equipment by that company, has been formed and is to be enlisted for the remainder of the war. Fourteen men have offered their services to the American Red Cross through Eliot Norton, representative of the American Red Cross in New York, who has charge of enlistments for field service in France. Plans have been made to furnish and equip at least seven ambulances. As American Red Cross men are volunteers without pay, the unit is to be given financial backing by the entire Armco organization, which will pay all transportation charges and support the volunteers in the field. The unit is to be identified as a representative of the working organization of the company and not as a unit of individuals in the service of the American Red Cross.

Heavy Tonnages

Of Material to Rehabilitate Mexican Railways Will be Bought

Houston, Tex., July 30.—The Constitutionalist Railways of Mexico, formerly called the National Railways of Mexico, has established a general purchasing agency here for the purpose of placing orders for materials and supplies to be used in rehabilitating that government-owned system of transportation. It was stated by Felipe Pescador, director general of the system, who was here recently on business connected with making purchases for the railways, that the work of building new cars is progressing rapidly in the shops at Aguas Calientes and the City of Mexico. It will be necessary, however, to buy in this country large quantities of iron and steel fittings for the cars, including wheels and tracks. All the lumber that enters into the building of the cars must come from this country, he said. An enormous tonnage of new rails will be necessary for the different divisions of the more than 8000 miles of track comprising the Constitutionalist Railways of Mexico to be put in fit condition for traffic. The Mexican government has placed a large order for rails with the Monterey Steel & Iron Co., and their delivery is to take place as rapidly as this plant can roll them.

Building Tool Plant

The Sutherland Tool Co., Greenville, Mich., recently incorporated with a capital stock of $30,000, has elected the following officers: President, F. B. Sutherland, Flint; vice president, Benjamin Wolfe; secretary and treasurer, E. A. Kemp, Greenville; directors, F. B. Sutherland, Ed G. Hickock, George C. Bower, E. A. Kemp and Benjamin Wolfe. The company specializes in recutting milling cutters. A new plant now is in course of construction and will be completed within 60 days. All initial equipment requirements have been provided for.

New Mines

For Brazilian Manganese Ore Being Opened by American Capital

Many new manganese ore mines have been opened in Brazil in consequence of the abnormal demand made upon that country by the United States. It is stated 80 per cent of the manganese ore supply of the United States now is obtained from Brazil. New mines opered in the state of Minas Geraes and the state of Bahia, have contributed largely in increasing the export tonnage of 288,671, valued at $2,632,427 in 1915, to 503,120 with a valuation of $7,080,954 in 1916.

A newly formed American company recently purchased four mines in Bahia. The largest of these is in the municipality of Bon-Fin and is accessible to the Central Railway of Brazil; the other mines are near Nazareth and have no railway outlets at present, and such ore as is mined must be taken by lighters to the Bay of Bahia and there placed aboard ship. With better railway facilities from 15,000 to 20,000 tons of manganese ore could be shipped monthly from these mines, with Bahia as the point of general export. Among technical men it is the prevailing belief that the entire manganese problem of Brazil is one of communication by highway in many interior districts and from commercial centers of those districts by rail to tidewater.

Mills Are Installed

Installation by the Lackawanna Steel Co. at its plant at Lackawanna, N. Y., of the rolling mill equipment which it purchased from the Farist Steel Co., Bridgeport, several months ago, has been completed. This equipment includes four trains of rolls, 10, 12, 15 and 16-inch, respectively, all 3-high.

Buys Steel Foundry

McCord & Co., Chicago, manufacturers of railroad equipment, have purchased from the Illinois Central railroad a 3½-acre site improved with a large plant which the purchasers have occupied for two or three years as a steel foundry for the manufacture of journal boxes. The purchase price was $60,000.

To Make Crucible Steel

The Century Steel Co. of America, 120 Broadway, New York, rapidly is completing its new plant at Poughkeepsie, N. Y., and expects to run the first heat Aug. 15. The plant comprises five buildings located on a 9-acre tract at Poughkeepsie. Its output will be plain and high speed tool steel produced in crucibles at the rate of 200 tons monthly. As soon as the present buildings are completed and in operation, the company will add an open-hearth furnace for producing special alloy steels. The officers are as follows: President, F. B. Lown; first vice president, H. B. Perkins; second vice president, W. P. Hartshorne; secretary and treasurer, W. B. Dukshire; general sales manager, J. W. Phillips; works manager, W. F. Dukshire.

Plant is Conveyed

The plant of the Mitchell Wagon Co., Racine, Wis., has been conveyed to the Mitchell Motors Co., which is installing considerable new equipment for the manufacture of automobile bodies. The Mitchell Wagon Co. has disposed of its business to Deere & Co., Moline, Ill., which will transfer it to its wagon works at Fort Smith, Ark., immediately. The purchase includes the patterns, good will, trademark, patents and stock of materials. The Mitchell company is one of the oldest industries of the northwest, having been founded in 1847 by Henry Mitchell.

Company is Reorganized

The reorganization of the Termaat & Monahan Co., Oshkosh, Wis., in receivership since the fall of 1916, under the style of Termaat & Monahan Mfg. Co., capital stock, $300,000, has been approved by the circuit court and the property transferred. The stockholders' committee paid $30,000 in cash for the assets and assumed all encumbrances. For more than a month the new company has been operating the foundry and machine shop on a part-time basis under a temporary lease, and it is now preparing to re-open the entire works. The company is a large manufacturer of marine and stationary gas engines and machine tools.

Purchasing Agents Will Hold Convention

The annual congress of purchasing agents under the auspices of the National Association of Purchasing Agents will be held at Pittsburgh Oct. 9, 10 and 11. The program includes business sessions in the mornings and visitation of industrial plants in the afternoons. The banquet will be held at the convention hotel, the evening of Oct. 10 and will be addressed by speakers of national prominence. Various social functions in connection with the convention have been planned. The National Association of Purchasing Agents is the outgrowth of a movement originated about five years ago and has a membership of more than 1000 made up of local branches in different leading cities. The object of the organization is to acquire and disseminate beneficial information for those engaged in purchasing capacities. The officers of the association are: E. L. McGrew, Standard Underground Cable Co., Pittsburgh, president; F. W. Rowe, H. W. Johns-Manville Co., New York, first vice president; N. O. Aeby, Jeffrey Mfg. Co., Columbus, O., second vice president; N. L. Morse, Southern California Gas Co., third vice president; E. H. Ridgway, Colonial Steel Co., Pittsburgh, treasurer; E. B. Hendricks, New York, secretary.

Pittsburgh Employers Will Protect Their Plants

The Employers' Association of Pittsburgh has completed plans for the establishment of a department of investigation, the chief duties of which will be to keep members of the association advised as to the selective draft situation with respect to their men and to co-operate with the federal departments of justice and war to detect enemy agents who may enter plants of members under war contracts. Raymond E. Horn, for some time assistant chief of the bureau of investigation of the federal department of justice, now is connected with the Pittsburgh association. He has had 10 years' experience in investigation work and will act in the capacity of a consulting agent to members of the association. William Frew Long, vice president and general manager of the society, sent out bulletins a few days ago, telling about the new department and offering data about exemptions from the federal service.

To Make Small Tools

Succeeding the Gorham Tool Co., Detroit, the Gorham & Goddard Co., of that city, has been organized with $75,000 capital, and has taken over the entire salvaging business of the first named company, with the object of continuing the manufacture of special goods, jigs, dies, reamers, etc. The personnel of the new company includes: L. C. Gorham, president; Dwight Goddard, treasurer; H. B. Lawton, secretary, and A. N. Goddard, general manager.

The Harlan & Hollingsworth Co., Wilmington, Del., has received a contract for the construction of engines for 25 mine sweepers.

Build Ships

Says Hurley on Taking Charge of Government Program

Washington, July 31.—The remodeled shipping board is committed to a policy of action. Edward N. Hurley, the new chairman, summed up his views in a few words immediately after his appointment. "We must build ships, not talk about them," said Mr. Hurley. "American labor, the most skillful and intelligent in the world, can turn out the ships in record-breaking time, and we are going to buckle down and get busy." Both Mr. Hurley, who succeeded Denman, and Rear Admiral Capps, who succeeded General Goethals, have been busily at work, mastering the details of their new work. Definite action is expected at any time on a comprehensive plan to turn the country's resources over to the construction of ships on a huge scale. The impression is generally held that the essential features of the Goethals' plans will be retained. One of the most important features of these plans was the construction of two huge government yards to build 400 vessels in 18 to 24 months.

Representatives of the American International Corp. had practically closed negotiations for constructing one of these yards on Hog island, Delaware river, when the crisis in the Goethals-Denman situation, halted further progress. The plans for this yard are all complete, however, the organization is ready, and arrangements have been made for the equipment. Federal assistance was to be secured to obtain material.

"In regard to these yards," said one high authority, "not as much time has been lost as the public believes. The plans had to be prepared and they are now ready. They were rushed through as rapidly as humanly possible. If the new officers approve the plans, work can be started immediately."

These plans provide for building 50 ways, on which an equal number of vessels of 7500 tons register can be built simultaneously. The Goethals' plan gave the builders an option to purchase the yard at the completion of the contract. The American International Corp. plans provided for handling the entire contract from the building of the ways to the completion of the boats.

The other yard was proposed on Newark bay, where the Submarine Boat Corp. has leased property. These ships were to be of 5000 tons register, the number of vessels involved also being 200. These two yards, in addition to providing the ships now imperatively needed, would have furnished this country with splendid facilities for turning out the standardized ships which many authorities believe will play an important part in shipping affairs after the war.

Modify Explosive Rules

Washington, July 31.—As a war measure, the interstate commerce commission has modified its regulations on the transportation of explosives and other dangerous articles. An order issued a few days ago authorizes cylinders intended for use as and actually forming a permanent part of the starting equipment for internal combustion engines of diesel or similar type to be used for the transportation of compressed air at a pressure not exceeding 1000 pounds per square inch at 70 degrees Fahr., provided the cylinder meets requirements specified by the commission, including hydrostatic and physical tests. The cylinders must be lapwelded pipe of steel not containing more than 0.20 per cent carbon, 0.11 per cent phosphorus and 0.05 per cent sulphur. The pipe must be lapwelded by the forging process.

Improvements at the No. 1 slope at Sloss, Ala., of the Sloss-Sheffield Steel & Iron Co. consist of the construction of a new steel tipple and a 50 x 110-foot concrete building to be used as a machine and blacksmith shop, and storehouse.

Obituaries

William Neale Goddard, formerly with the sales department of the American Steel & Wire Co., was killed June 12 by a shell explosion while rescuing wounded on the battle front in France. Mr. Goddard, at the beginning of the war went to England and enlisted as a private. Shortly after he became captain of the 21st Batallion, Lancashire Fusiliers. He was accompanied to England by Mrs. Goddard who served as a Red Cross nurse.

Robert Bustard, retired locomotive builder and officer of the old Rogers Locomotive Works, Harrison, N. J., died recently, aged 83.

Job C. Tripp, for 20 years manager of the Boston & Fairhaven Iron Works, died at his home in Fairhaven, Mass., recently, aged 88 years.

Solomon M. Cutter, for 10 years superintendent of the Capewell Horse Nail Co., Hartford, Conn., died at his home in Wethersfield, Conn., recently, after a long illness, aged 67 years.

Lee McCallum, aged 49 years, president of the New York Metal Ceiling Co., New York, died recently on a train bound for his home from Dover, Del. Death was due to heart disease.

Frank B. Bradley, vice president of the Ajax Forge Co., Chicago, died recently, following a brief illness. Mr. Bradley was 51 years of age and had resided in Chicago all his life.

Samuel R. Bailey, for years a leading manufacturer of light carriages and sleighs, who originated the idea of the drop forging of carriage parts as well as other methods in carriage work, died at his home in Amesbury, Mass., recently, aged 79 years.

Wallace D. Yaple, a member of the Ohio state industrial commission, died recently at his home in Chillicothe, O. Mr. Yaple formerly was mayor of Chillicothe and had become well known throughout the country as an expert on workmen's compensation insurance.

Valentine Nortmann, one of the founders of the Nortmann-Duffke Foundry Co., Milwaukee, and for many years its president, died at his home in Milwaukee recently, aged 60 years. Mr. Nortmann was a native of Milwaukee and was prominent in the middle west foundry trade. Two years ago he retired from active business.

Karl T. Phelps, secretary of the J. H. Hillman & Sons Co., Pittsburgh, died unexpectedly at the Waynesburg hospital, Waynesburg, Pa., recently. He went to Waynesburg recently in the interests of the Hillman company and was taken critically ill. He had been secretary of the Hillman interests for five years. Mr. Phelps recently had felt indisposed, but apparently was on the road to recovery.

Theodore Phillips Burgess, a prominent inventor, who died recently, at his home in Dedham, Mass., after an illness of several months, was the founder of the Sulphate Fibre Co., Berlin Falls, N. H., one of the largest manufacturers of machinery in the world. He retired from the company three years ago. Mr. Burgess was the inventor of many machinery patterns made by the company. He was 52 years old and a graduate of Harvard.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

War Taxation Waits as Total Mounts

WASHINGTON, July 31.—The entire question of war taxation has been thrown wide open by the appearance of Secretary McAdoo before the senate committee on finance last week with a request for $5,000,000,000 additional. Business men who have been waiting uncertainly for weeks to learn what part of the burden they must carry, may not know for several weeks yet the extent of the levy congress will impose on industry. The problem of matching expenditures with tax receipts and bonds is being considered practically anew.

Secretary McAdoo's request was made last week just at the time that the senate committee was preparing to submit its favorable report on a war revenue bill carrying $1,670,000,000. This report, however, would not have been passed immediately by the senate, as many senators were in favor of awaiting action on other important measures carrying heavy appropriations in order to determine first the amount of money which the government would need. The house also was restive over the way in which the senate committee had practically redrawn its bill.

Leave It to the House

After several days of uncertainty regarding the best method of meeting Secretary McAdoo's request, the sentiment in the senate committee now favors the announced plan of putting the question up to the house, where revenue bills must originate, and of pushing through the senate the redrawn house bill. The $1,810,000,000 originally carried by the house bill, and which had been pared to $1,670,000,000, probably will be increased to $1,943,000,000. To obtain this additional $273,000,000, the senate is expected to agree upon higher income and corporation taxes, as there is considerable reluctance to the imposition, at this time, of taxes on consumption.

Developments of the past few days indicate, therefore, that the prospect of relieving the country's industries from what many manufacturers feel is a disproportionately heavy share of the taxation burden, is less bright than before the full extent of the government's plans became known. Many of the legislators in both houses have just begun to appreciate the enormity of the financial load this country must carry, Senator Smoot pointed out a few days ago that appropriations for the current fiscal year would be near $17,000,000,000. Past and future bond issues, of course, will be needed to supply a large part of this sum, but there is a general disposition to provide tax receipts in at least as large a sum as the house approved some weeks ago.

Secretary McAdoo, after his appearance before the senate committee, was asked to give more specific details of the government's expenses and also to secure estimates from all departments so that definite knowledge would be available of the grand total of expenditures planned for the next year. This combined estimate was furnished later and indicated that governmental expenses would be $10,755,807,000. Appropriations for all departments already provided, pending or proposed, total $11,651,193,993, an excess of $895,386,993 to take care of emergency requirements. In addition, loans to our allies are expected to aggregate $5,000,000,000, bringing the total close to the Smoot estimate.

Of this sum, the first Liberty loan provided $2,000,000,000; the war revenue bill as it stands, $1,943,000,000, and normal tax receipts $1,333,500,000, a total of $5,276,500,000. Secretary McAdoo thus asked for $5,000,000,000 additional to bring the total close to his estimate of nearly eleven billions, leaving the question of the allied loans to be disposed of later.

Comparatively few protests have reached Washington recently regarding the war revenue bill as the general uncertainty apparently led manufacturers to await some definite outline of the legislative policy. These protests generally are directed at the plans to tax excess profits and undivided surplus. The criticisms are leveled not at the project to tax excess profits but at the means of levying this tax which the senate committee has adopted. Prospects for reducing the total carried in the bill are far from bright and comparatively few changes are expected to be made by the senate in the methods by which this total is to be secured.

A number of senators have taken the attitude that a heavier tax burden should not be placed upon the country at this time. They have expressed their opinion that bond issues, either long term or short term, or both, should be floated to meet the government's extraordinary expenditures. The certainty of heavy bond issues, however, regardless of the amount raised by taxation, has strengthened the impression that the total provided in the war revenue bill will not be reduced.

Way Cleared to Rebuild Bon Air Properties

Litigation of several years' duration was terminated when Chancellor Allison, of Nashville, Tenn., confirmed the sale of the properties of the Bon Air Coal & Iron Co., of that city, to W. J. Cummins and associates. The Bon Air company was incorporated in 1902 and has been in the hands of receivers since June, 1910. Articles of incorporation have been filed by Mr. Cummins and associates for the Bon Air Coal & Iron Corp., capitalized at $10,000,000, preliminary to the development of the properties generally and the commencing of the complete rehabilitation of the towns of Allens Creek, Eastland, Bon Air and Ravenscroft. The task of rehabilitating the corporation's properties already has commenced. Two more stoves are to be added to the blast furnaces at Allens Creek and it is thought that the production of foundry iron, high-phosphorus and high-silicon pig accordingly will be increased to 200 tons daily. New drift mines are to be opened at Ravenscroft, Eastland and Bon Air. The installation of new machinery and equipment will increase the capacity of the mines to 10,000 tons of

coal daily. Officers of the new corporation are as follows: President, Alex R. Peacock, of New York, formerly vice president and general sales manager of the Carnegie Steel Co.; vice president, W. J. Cummins, of Nashville, banker; secretary and general manager, A. J. Moreland, of Pittsburgh, formerly associated with the Carnegie Steel Co.; treasurer and chairman, John M. Bowman, of New York. General headquarters of the corporation will be maintained in New York and offices will be established in Nashville.

General Steel Co. Succeeds New Valley Steel Co.

A charter has been taken out in Delaware by the General Steel Co., which is the new name of the Valley Steel Co., a New York state corporation, recently formed to build a steel works at St. Francis, Wis., a few miles south of Milwaukee. The General Steel Co. has 13,000 shares of preferred stock par value $50, and 16,000 shares of common stock with no par value. A meeting for organization is to be held soon. The first unit of the new plant, as announced in the May 24 issue of THE IRON TRADE REVIEW, will consist of two 80-ton open-hearth furnaces, three 10-ton and one 1½-ton electric furnaces, and a 10-inch merchant bar mill. The plans also call for a 24-inch billet mill and a 104-inch plate mill. The equipment will be housed in a main building, 680 x 85 feet. W. E. Moore & Co., consulting engineers, Pittsburgh, have charge of the construction of the plant.

Gulf State Doubles Net

Report of the net operating income of the Gulf States Steel Co., Birmingham, Ala., for the first six months of 1917 shows a total of $2,063,833, an increase of $1,053,579 over the first half of 1916, when the earnings were $1,010,254. The June income, $398,122, was an increase of $211,809 over June, 1916, which had $186,313.

Want Stock Appraised

Minority stockholders of the Westinghouse Machine Co., Pittsburgh, who did not dispose of their interests to the Westinghouse Electric & Mfg. Co., have petitioned the courts to appoint appraisers to determine the value of their holdings. The Westinghouse Electric company offered the objecting minority stockholders $35 a share for their stock and an outside interest has offered to exchange Westinghouse Electric for Westinghouse Machine stock on a basis of share for share, but so far the offer has not been accepted. The company now is controlled by the Westinghouse Electric, which is seeking ownership of the 2 per cent outstanding stock.

Financial Crop Ends

The Atwater Mfg. Co., Southington, Conn., has elected the following officers for the ensuing year: Albert M. Smith, president and treasurer; Bradley H. Barnes, vice president; John Hemingway, secretary; who, with James H. Pratt and Leo Davis, Norwalk, Conn., are directors.

* * *

The plant of the Keystone Farm Machine Co., York, Pa., manufacturers of farm implements, which has been operated under receivership for several years, has been sold by order of the court to Henry C. Niles, for $100,000.

* * *

W. E. Prindle, president of the Buckeye Dryer Co., London, O., maker of dryers for all purposes, states that the recent incorporation of the company is the putting into corporate form of an established business, and that no enlargements are contemplated. The company lately was incorporated with $30,000 capital, divided equally into common and preferred stock.

* * *

Recently incorporated with $10,000 capital to engage in the manufacturing of tools, discs and special machinery, the Security Tool Works, Inc., 859 North Franklin street, Chicago, has elected the following officers: President, W. L. Lundgren; vice president, A. Abrahamson; secretary, Benjamin Clarke, and treasurer and manager, H. B. Chandler.

* * *

Decision has been reserved in the suit of the General Investment Co. to restrain the Bethlehem Steel Corp. from carrying out a resolution guaranteeing $200,000,000 to secure the payment of bonds or obligations of subsidiary companies which was argued before Judge Rellstab in the United States district court at Newark, N. J., recently.

* * *

The purchase of the Seaboard works of the Penn Seaboard Corp. by the American Locomotive Co., will not affect the present management of the steel plant, it is announced. S. Edward Sproul will continue as manager with David D. Stokes as assistant manager. Mr. Sproul has been in charge of the Seaboard plant for the past 15 years. It is expected that another building as large as the present structure, will be erected.

* * *

At the annual stockholders meeting of the Fertel-Dangler-Wilson Co. at Cleveland, July 10, the following directors were elected for the ensuing year: C. S. Dangler, F. B. Dangler, A. A. Murfey, S. Fertel, W. E. Fertel A. E. Fertel and I. F. Freiberger, Officers chosen follows: C. S. Dangler, president; F. B. Dangler, M. H. Wilson Jr. and A. A. Murfey, vice presidents; S. Fertel, treasurer and general manager; W. E. Fertel, assistant treasurer; I. F. Frieberger, secretary.

Heavy Buying

Of Spot Phenol and Benzol for Manufacturers of High Explosives

New York, July 28.—Large sales of phenol and benzol were the principal developments of the week in the coal tar products market. Sales of the former involved a large amount of spot material, mostly to domestic manufacturers of high explosives. Some phenol also was sold for export. These sales have led to a comparative scarcity of spot phenol and prices now are higher. Spot is quoted at 40c to 45c per pound at producers' plant; the contract market is nominal. Sales of benzol this week also involved spot principally and were made both to domestic and foreign makers of picric acid. Pure benzol continues at 55c to 60c per gallon at producers' plant both for spot and contract.

No action has developed with respect to requirements of toluol for the trinitrotoluol needs of the United States government. Large quantities of toluol for next year are wanted by the trinitrotoluol makers, but output is so sold ahead that it is difficult to arrange for the new business. Discussion continues of methods to make up the present shortage. Any great increase in the production of toluol would be difficult to carry out and would require considerable time. On the other hand, benzol could be employed for making picric acid on a larger scale than at present.

Solvent naphtha continues slow and is quoted at 18c to 25c per gallon at producers' plant for spot and at 18c to 22c for contract. A few spot carload sales of sulphate of ammonia during the week were made from $4.85 to $5 per 100 pounds at seaboard. The contract market continues nominal.

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.18 to .25

Per Pound at Producers Plant.

Phenol	$0.40 to .45

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$4.85 to 5.00

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.18 to .22

Per Pound at Producers Plant.

Phenol (nominal)	nominal

Per 100 Pounds at Seaboard.

Sulphate of ammonia	nominal.

Foreign Demand For Tools Active

Heavy Orders for Japan and France Are Booked—Shipbuilders Giving Big Business to Machinery Houses—Pittsburgh Companies Come Out for Equipment—Chicago Market Solid

HEAVY demand for miscellaneous equipment for export, principally to Japan and France, features trading in the eastern machine tool market. One order, involving more than 80 lathes, has been placed for shipment to Japan, and inquiries are out for additional lathes and numerous other machine tools for that country. Current export business for France includes one order for the Automobiles Berliet Co. calling for about 17 cranes and other equipment. Other demand from France includes lathes, planers, shapers and milling machines in large volume for nearby shipment.

Domestic business generally in the east is quiet, pending definite information relative to the construction program of the new shipping board. It is understood, however, that Edward N. Hurley, newly-appointed chairman of the board, is not committed to any one special program, except the expeditious construction of ships, regardless of type, whether wooden vessels or steel vessels. This stand presages action in the near future.

Several scattered inquiries continue to come out from munition makers calling for one and two tools each, but not in the volume of the past week. The government's comprehensive aviation program undoubtedly soon will be felt in the trade, although it is generally believed that the machine tool requirements of aircraft builders as a whole will be comparatively small. However, special machines, such as grinders, will be needed in large numbers. One feature of the present market is the great scarcity of punching and shearing machinery, and as a result these tools today are in practically the same position as lathes a year and a half ago. Builders who have equipment of this type for early delivery can virtually obtain their own price. It is reported that a newly organized shipbuilding company has just placed heavy orders for second-hand machine tools.

The crane market during the past week also has reflected the slowing up in domestic business. Among orders recently placed was one including 14 cranes ranging in capacity up to 75 tons, for the Newport News Shipbuilding & Dry Dock Co. This business, it is understood, went to the Heyl & Patterson Co., Pittsburgh, and the Shaw Electric Crane Co., New York. This is the second order of this nature to be placed by the Newport News company with these interests within the past few weeks. The Groton Iron Works, Groton, Conn., affiliated with the Groton Shipbuilding Co., has issued inquiries for two cranes of 15 and 30 tons capacity. It is understood this company recently has placed several orders for machine tools. The Staten Island Shipbuilding Co. is in the market for a 20-ton and a 75-ton crane. Demand from the railroads has remained dull.

An interesting development of the past few days has been the formation of the Federal Shipbuilding Co. by interests affiliated with the United States Steel Corp. The company has been incorporated in New Jersey with a capital stock of $3,000,000. Construction on a plant, costing $6,000,000, has been begun on a 150-acre site near Hackensack, N. J. Ways will be erected for 10 large ocean freighters. George MacGregor, vice president, has charge of the construction and operation of the plant. It is understood that a considerable amount of machine tool equipment will be purchased shortly.

C. W. Leavitt & Co., Hudson Terminal building, New York, are interested in receiving catalogs and quotations for export on oil and tar-fired furnaces for tempering and annealing steel. Quotations on heat-treating equipment including pyrometers for use in connection with high-speed steel heating apparatus are desired.

Government Inquiries Are Good

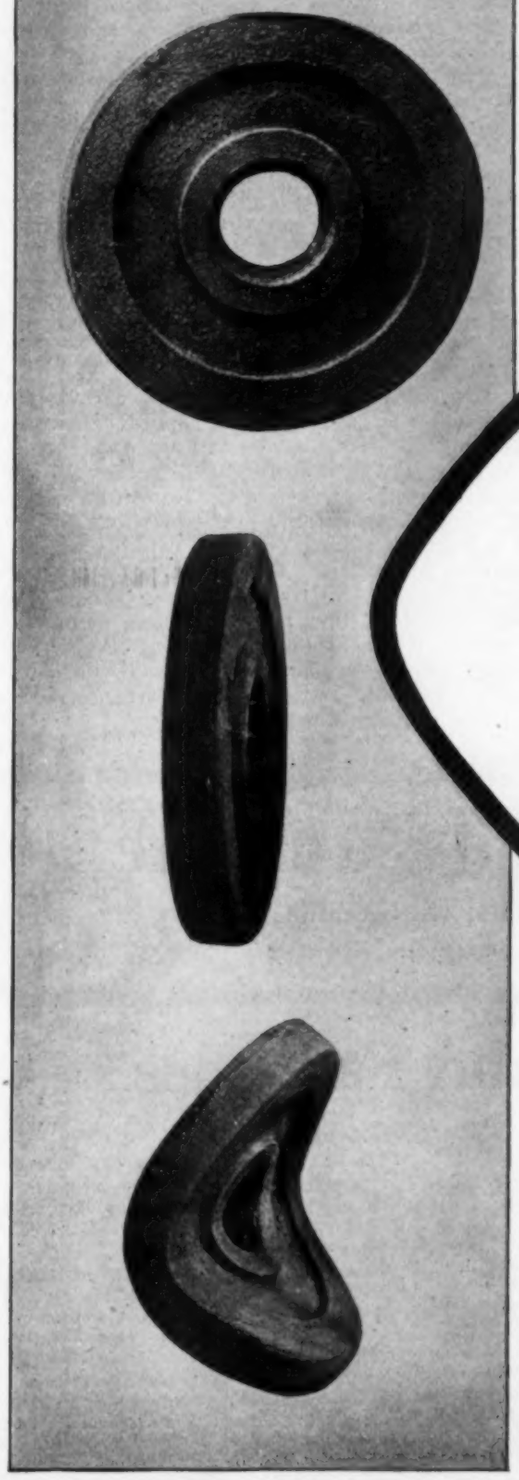
Mechanical equipment for the new navy projectile plant at Charleston, W. Va., continues to be called for in numerous proposals being put out by the bureau of supplies and accounts navy department. On Aug. 14 bids will be taken on five motor-driven lathes, two milling machines, two motor-driven shapers, two motor-driven vertical milling machines, one grinding machine, one planing machine, five engine lathes, one boring and turning mill, three shapers, four tool grinders, universal drill and spindle press; on Aug. 7, for one vertical drilling machine; other equipment called for by the bureau for various navy yards includes one surface grinding machine for Charleston, S. C., two milling machines, two turret screw machines, and one motor-driven planer for Philadelphia, and one boring and turning mill for Boston.

Proposals will be received Aug. 13 on eight electric monorail hoists, monorail track, supports, switches, turntables and trolley rails for the new foundry of the navy yard at Norfolk, Va. Bids will be taken Aug. 7 by the bureau of supplies and accounts, navy department, on two motor-driven flat-turret lathes, 10 engine lathes, four high-duty drills, one universal milling machine, one horizontal milling machine, boring and turning mill and motor-driven tool room lathe.

Heavy Buying Expected at Chicago

RECENT government orders for motor trucks and field pieces, together with the ever increasing shipbuilding activities, have served to maintain an active volume of machine tool buying in spite of the undecisiveness which characterizes, almost entirely, the iron and steel industry. Munition makers in general are not buying huge lists of tools, as most of them are already well equipped, but are adding miscellaneous machines to their shops from time to time. The Wisconsin Gun Co., Milwaukee, which is said to have completed arrangements to supply the government with field pieces, has not yet entered the market for equipment, but is expected to do so shortly. It is understood that an entirely new shop will be erected. Shipbuilders are still inquiring for equipment, but find few machines of the desired type available in the open market. Pipe machines and bolt cutters are being shipped without delay to shipbuilders, but shears and punches cannot be delivered within a period of six or seven months. The Kelly-Atkinson Construc-

AGATHON
Alloy STEELS



The illustrations on the left were made direct from a gear blank forged from AGATHON Chrome Vanadium SPECIAL GEAR STOCK before and after an unusually severe test.

Although the blank was bent almost double while cold, not a single sign of fracture developed.

The Anderson Forge & Machine Co.
Detroit, Michigan

who forged this blank and conducted the test, are staunch believers in "AGATHON" Quality.

"Agathon" Steels will serve your purpose best.

The Central Steel Company
Massillon, Ohio

Detroit Office:—326-27-28 Ford Bldg., F. Walter Gutbert, District Representative. Cleveland Office:—Hickox Bldg., The Hamill-Hickox Co., District Representative. Chicago Office:—Room 1370 Peoples Gas Bldg., 122 South Michigan Blvd., A. Schaeffer, District Sales Manager. Philadelphia Office:—902 Widener Bldg., Frank Wallace, District Sales Manager. J. E. Dackendorff & Co., General Export Agents, 20 Broad St., New York, N.Y.

AGATHON STEELS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

tion Co., Chicago, has signed a contract with the shipping board which requires it to build 20 cargo carrying vessels for the government by December, 1918. The contract price for these is $9,000,000. The Kelly company, which has been in the steel construction business for years, plans to spend approximately $500,000 for a shipyard and equipment. The new plant probably will be located on the Mississippi river. Lists of requirements for tools for the new buildings at the Rock Island arsenal have not been issued as yet and, as previously stated, buying will be handled by the contractors, Stone & Webster, and Westinghouse, Church, Kerr & Co. Dealers here believe that owing to the prevailing conditions existing in the machine tool markets, buying on these lists will not be through one market, but will be accomplished wherever the desired tools are obtainable. Although the volume of business being done by machine tool dealers is most encouraging, sellers of tools report a decided lessening in the demand for tools, by such regular buyers as machine and repair shops, whose purchases ordinarily constitute the majority of transactions. In this situation is reflected prevailing conditions in the iron and steel markets, which preclude purchase of raw materials, by manufacturers, thus tending to prohibit plant extensions.

Inquiries Out in Pittsburgh

MUNITION makers and shipbuilders are the most active factors in the machine tool market at Pittsburgh. The former are buying large numbers of cranes, punches and shears. It is reported that one of the concerns that recently completed a contract for British shells is offering 800 lathes in the open market. The General Electric Co., Schenectady, N. Y., is buying equipment for an extension to its turbine department. The Brier Hill Steel Co., Youngstown, is negotiating for five lathes, two shapers, a large press, a planer and milling and slotting equipment. The Union Switch & Signal Co. is installing new equipment in its foundry and machine shop at Swissvale, Pa. Deliveries of lathes are becoming more deferred, due to heavy demand and shop delays caused by the scarcity of skilled mechanics. The Superior Steel Corp., Pittsburgh, is in the market for a 1500-kilowatt mixed-flow pressure turbine of from 230 to 250 volts.

Cleveland Business Slackens

SHARP slackening of sales in the Cleveland tool market was noted the first of the week. Several dealers state that the usual summer lull has arrived at last, and that while some good business is being placed with Cleveland machinery companies, the volume fails to equal the records set for previous months. The Lang Auto Body Co., Cleveland, has purchased five acres of ground in the vicinity of West 106th street and Lorain avenue, Cleveland, plans to erect an L-shaped structure, costing about $100,000. It is stated that this plant will be used to manufacture automobile bodies, airplanes and truck bodies. Plans for the building are being prepared by Paul Schmitt, engineer. The Blomquist-Eck Mfg. Co., Ajax building, Cleveland, has had plans prepared for a 60 x 200-foot building at 1156 East 152d street, Cleveland. This company has recently developed a machine tool which is expected to appear on the market shortly. It is said this development by the Blomquist-Eck company consists of a boring, milling, drilling and tapping machine, embodying a number of unusual features. The Scientific Heater Co., 1065 East 152d street, Cleveland, is in the market for an 8-foot or 10-foot power squaring shear to cut up to 12-gage or 14-gage material. The Ferguson Steel & Iron Co., Buffalo, is in the market for ¾-inch or 1-inch capacity punches and a number of riveters. L. F. Fleming is purchasing agent. The K. C. Iron Works, Cleveland, has purchased a 75 x 153-foot plot and plans to erect a 2-story plant. The National Tool Co., 1950 West 105th street, Cleveland, plans to erect a 1-story plant addition to cost about $12,000. Plans are now being prepared, and work will start shortly.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BOOTHBAY HARBOR, ME.—The Atlantic Coast Co. has been incorporated with $2,000,000 capital and has taken over the plant of the Townsend Marine Ry. & Construction Co. and a lease of a yard in Thomaston, Me.

BOOTHBAY HARBOR, ME.—The Boothbay Harbor Shipbuilding Co. has been incorporated with $200,000 capital by Z. E. Cliff and Howard E. Wemyss. The yard of Irving W. Reed has been purchased.

BOSTON.—The West & Dodge Co. has been incorporated to build machinery in Boston and Detroit with $75,000 capital by Herbert E. Dodge and Ralph M. Smith, Somerville, Mass.

BOSTON.—The Portland Street Garage, Inc., will build a reinforced concrete and brick, 6-story, 78 x 140-foot building to cost between $150,000 and $175,000 at 125-127 Portland street.

BOSTON.—W. D. Sohier will build a brick, 1-story, 40 x 100-foot manufacturing building at Harrison avenue, Canton and Hamburg streets.

BOSTON.—The B & B Iron Works, Inc., has been incorporated with $10,000 capital by John F. Sutherland, C. M. Sawyer and E. E. Mullen.

BOSTON.—Christensen & Co. Inc., has been incorporated as a general machinist with $15,000 capital by Robert R. Gurney, P. Van Riper and N. Christensen.

BOSTON.—The Nauffts Co. has been incorporated to make brass and metal goods of every kind with $30,000 capital by George A. Nauffts, Arthur G. Nauffts and F. E. Zenone.

BOSTON.—The Eastern Road Machinery Co. has been incorporated with $10,000 capital by A. C. Wells, G. H. Voter and George E. Pearson, Hyde Park.

CAMBRIDGE, MASS.—The New England Steel Products Co. has let the contract for a concrete, 2-story, 42 x 60-foot storage warehouse and office building at Sidney and Henry streets.

CHICOPEE, MASS.—Work has been started by the Dana S. Courtney Co. in rebuilding a 260 x 262-foot shop and boiler room, to cost $75,000. The Lockwood-Green Co., 60 Federal street, Boston, is the architect.

FALL RIVER, MASS.—Nathan Yamins has

ONE
30-Ton Open Hearth
FURNACE
Now Ready.

Who wants the Entire Production of it for Ingots or Shell Blanks?

Hubbard Steel Foundry Co.
EAST CHICAGO, IND.
All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

let the contract for a brick and steel, 1-story, 65 x 102-foot building to cost $60,000 at 1363 Pleasant street.

FITCHBURG, MASS.—The general contract has been let to W. C. Carter for the construction of a 1-story, 40 x 82-foot structure for the Universal Grinding Co., to cost $8000.

HAVERHILL, MASS.—Michael Schiff will build a brick, mill construction, 5-story, 50 x 100-foot factory on River street.

HUDSON, MASS.—The Hudson Machine Screw Co. has been incorporated by Arthur H. MacBriar, South Sudbury, Mass., Morris H. Litchfield and Harry C. Moore.

MANSFIELD, MASS.—The Harding Mfg. Co. will build a brick, 30 x 100-foot factory on Winthrop avenue to replace that recently burned.

PITTSFIELD, MASS.—The Stone & Webster Engineering Corp., Boston, has the contract for a brick and steel extension to the power station of the Pittsfield Electric Co.

SPRINGFIELD, MASS. — The Warren & Irrgang Co. has been incorporated to make factory trucks, etc., with $25,000 capital by William F. Irrgang, Leicester Warren and A. H. Warren.

WORCESTER, MASS.—The Hubbard Machine Co. has been incorporated with $25,000 capital by Frank C. Smith, Chester E. Williams and Ira B. Hubbard.

WOBURN, MASS.—Work has been started on a 1-story, 40 x 57-foot machine shop for the Woburn Machine Co., to cost $3600. Thomas M. Harriman is president.

WORCESTER, MASS.—The Crompton & Knowles Loom Works will build a reinforced concrete, 4-story, 62 x 200-foot storehouse. Lockwood, Greene & Co., Boston, are the engineers.

PAWTUCKET, R. I.—The Bromley Mills has let the contract for a brick, 1 and 2-story, 100 x 110-foot and 50 x 130-foot mill to cost $30,000 on Lonsdale avenue and Main street.

BRIDGEPORT, CONN.—The International Tool & Gauge Co. has been incorporated with $10,000 capital by John A. Wahlberg, Bennie Svetkey, Frank B. Carlson, Claus A. Palmquist and Charles J. Borg.

GROTON, CONN.—Work has been started on a 1-story, 64 x 117-foot pipe shop addition for the New London Ship & Engine Co. The new structure is to cost about $55,000.

HARTFORD, CONN.—The city will build a reinforced concrete, fireproof, 4-story and basement, 65 x 112-foot fire headquarters building on Pearl street to cost $100,000.

MIDDLETOWN, CONN. — The general contract has been let to H. S. Moore for the erection of a 1-story power house addition for the Cromwell water works.

NEW BRITAIN, CONN. — The Landers, Frary & Clark Co. has let the contract for a brick, mill construction, 1-story, 47 x 200-foot factory building on Center street.

STAMFORD, CONN.—The Stamford Rolling Mills Co. has awarded the general contract to the McGillivray Co., 508 West Twenty-third street, New York, for a 1-story, 40 x 50-foot mill addition, costing $3000.

Activities in the Central States

APPLETON, WIS.—Fraser & Greunke have been awarded the contract for erecting a fireproof boiler house and central heating plant, 40 x 70 feet, for Lawrence college.

CUDAHY, WIS.—The Federal Rubber Co., which is controlled by the Fisk interests of Chicopee Falls, Mass., has awarded contracts to the Leonard Construction Co., Chicago, for erecting a 6-story addition, 60 x 295 feet, and a 2-story addition to the office building, 40 x 145 feet, the whole to cost about $150,000.

KENOSHA, WIS.—The Geo. W. Stules Construction Co., 11 South La Salle street, Chicago, has been awarded the general contract for erecting a $250,000 hotel building at Kenosha for the Maxine-Carlton Hotel Co.

MILWAUKEE.—The Yahr & Lange Drug Co., 207-215 East Water street, has awarded the contract to C. Hennecke Co., Milwaukee, for a steel tower and tank, 119 feet high, for its automatic sprinkler system.

MILWAUKEE.—Articles of incorporation have been filed in behalf of the Wisconsin Tool & Supply Co. The capital stock is $20,000. The organizers include E. B. Arnold, John S. Stover and John W. Mapel.

MILWAUKEE. — Articles of incorporation have been filed in behalf of the Western Metal Specialties Co., Milwaukee. The capital stock is $30,000. The incorporators include C. H. Benton, L. E. Fichaux and A. U. Stettin.

MILWAUKEE. — The Wisconsin Gas & Electric Co., which operates electric and gas light utilities in several cities in southern Wisconsin, has increased its capital stock from $2,750,000 to $3,350,000. A power plant addition is being erected at Racine.

NEENAH, WIS.—The C. R. Meyer & Sons Co., Oshkosh, Wis., has taken the contract for erecting a $20,000 addition to the plant of the Neenah Brass Works.

OSHKOSH, WIS.—The Oshkosh Foundry Co. recently has been incorporated with $10,000 capital. The incorporators are: Frank T. Turner, Joseph W. Radl and Hugo M. Stueck.

RACINE, WIS.—The Belle City Mfg. Co. is building a wood shop and foundry to cost about $25,000.

RACINE, WIS.—The J. I. Case Threshing Machine Co. is building a $12,000 addition to its South Works.

RACINE, WIS.—The Lockwood Oil Co. has awarded contracts for the erection of a warehouse addition and office building, 60 x 120 feet, estimated to cost about $25,000.

RACINE, WIS.—The R. H. Folwell Construction Co., McCormick building, Chicago, has taken the general contract for the erection of the new $1,000,000 plant of the Racine Auto Tire Co., 265 x 320 feet, five stories, of reinforced concrete, steel and brick.

SHAWANO, WIS.—The capacity of the Wisconsin Potash Co. is being more than doubled in size. Much new equipment, including a new steam pump, a boiler and four tanks, will be installed.

COLDWATER, MICH.—The Michigan Tire & Rubber Co. soon will let contracts for a 2-story, 60 x 300-foot building and a 60 x 60-foot building. A total expenditure of about $60,000 is involved.

DETROIT.—The Slaymaker Electric Welding Co. has been incorporated to manufacture and sell welding machinery, welded products, tools, etc., with an authorized capital of $280,000.

DETROIT.—The Parker Mfg. Co. lately has been chartered with $75,000 capital for the purpose of engaging in manufacturing, selling and jobbing of machine products. Gorham C. Parker, David J. Rice and H. K. Chambers are the incorporators.

FLINT, MICH.—The Flint Foundry Co., manufacturer of automobile castings, contemplates the erection of a 50-ton casting shop. F. L. Carpenter is manager of the company.

HILLSDALE, MICH.—The Alamo Engine Co. has been incorporated with $350,000 capital to engage in the manufacture of engines. The incorporators are: Charles T. Mitchell, E. Y. Mitchell and M. M. Barry.

LANSING, MICH.—The Sleaford Power Lawn Mower Co. recently has been chartered with $20,000 capital by William M. Sleaford, A. F. and Charles S. May.

CHICAGO.—The Scott Valve Co. has been chartered with $25,000 capital by Frank King, George W. Clucas and J. J. Hayes.

CHICAGO.—Swift & Co., packers, plan to erect a 6-story, 75 x 115-foot soap boiling building to cost $45,000.

CHICAGO.—The Edward Valve & Mfg. Co. plans to erect a 1-story, 80 x 100-foot steel foundry to cost about $30,000. W. T. Braniţzky, 64 West Randolph street, is architect.

CHICAGO.—Fitzpatrick Bros., soap manufacturers, West Thirty-second place and Benson street, whose factory was damaged by fire recently, plan to reconstruct their plant at a cost of from $75,000 to $80,000 .

CHICAGO.—The Standard Patent Steel Co. is erecting a 100 x 160-foot heavy mill construction factory at Fullerton and Racine avenues. The new building will cost $15,000.

CHICAGO.—The Octigan Forge Co., T. P. Octigan president, 2430 Lowe avenue, has received bids through architects Mundie & Jensen, 38 South La Salle street, for a 1-story machine and forge shop, 130 x 147 feet.

CHICAGO.—The Union Molding Co., William C. Marggraf, 1728 West Twenty-first street, whose 1-story factory at 2544 South Western avenue, was damaged by fire recently, plans to rebuild its plant.

CHICAGO.—The Illinois Central railroad is having prepared by its engineering department plans for a 2-story reinforced concrete boiler and engine house, 30 x 128 feet, to cost $20,000; a 1-story addition to a round house, and a coal chute to cost $38,000 in connection with the company's plant at Clinton, Ill.

CHICAGO.—Architect Frank D. Chase, 122 South Michigan avenue, has been retained to prepare plans for a malleable iron works at Temple, Pa. It will comprise probably five buildings of brick, steel and concrete construction to cost between $300,000 and $400,000 .

ROCKFORD, ILL.—The Rockford Milling Machine Co. plans to erect a 33 x 120-foot, 2-story office building to cost $20,000. Peterson & Johnson, Rockford, Ill., are the architects.

COLUMBUS, IND. — The Columbus Machine Works has been incorporated to manufacture plumbing and heating systems with $25,000 capital by Augustus Boyd and others.

CRAWFORDSVILLE, IND.—The Standard

Some Men Think of Exporting As They Thought of Advertising Twenty Years Ago—

Twenty years ago there were few national advertisers—today there are thousands. Then most manufacturers said, "My line is different—it can't be advertised." But the evidence of concrete results obtained from advertising has proved that argument wrong from every premise.

Today the same statement is made by manufacturers about the export sale of their goods. Soon business men will recognize the vital importance to their affairs of having an overseas demand for their products that is just as firmly established as their domestic trade.

You will find no magic wand to direct export orders into your factory. This is a specialized trade that involves the most carefully thought-out selling plans, based on a practical knowledge of foreign market conditions, export practices and American factory methods.

FEDEX offers you an export service of the highest character. It accepts no connections with manufacturers unless it has investigated every phase of the export situation in each individual case. But once satisfied that it can co-operate with you, it will inaugurate an overseas campaign for your product that will place its sale on a permanent basis in the foreign markets under its control.

Particulars will be sent you on your request.

FEDERAL EXPORT CORPORATION

115 Broadway, New York

SHIPOWNERS EXPORTERS BANKERS

Brick Co. has been organized with $808,000 capital by H. E. Cobbs and others.

DECATUR, IND.—William F. Peterson, 204 South Wabash avenue, Chicago, has been awarded the general contract for a 3-story, 73 x 164-foot school building to cost $80,000.

ELKHART, IND.—The First National Bank of Elkhart plans to erect a 2-story, 60 x 150-foot bank building to cost $60,000.

LAFAYETTE, IND.—The Lafayette Life Insurance Co., Sixth street, has had drawings prepared by the Westcott Engineering Co., 111 West Washington street, Chicago, for a 10-story 50 x 125-foot steel and concrete bank and office building to cost $200,000 or more. J. T. A. Alexander & Son, Ball building, Lafayette, are the architects. Bids will be taken soon.

BARBERTON, O.—The Akron Rubber Mold & Machine Co. is having a survey made of its 5½-acre site, preliminary to the erection of a foundry building.

CINCINNATI.—The Belto Mfg. Co., capitalized at $10,000, has been organized to manufacture belting by Julius Waldner, Benjamin S. String, I. W. Lederer, Alfred Holzman and S. Waldner.

CINCINNATI.—The Modern Foundry Co. now is ready for bids on a 1-story building, 80 x 200 feet. Zettel & Rapp, Johnson building, are the architects.

CINCINNATI.—The Bahmann Iron Works Co. has had plans prepared by Stenger & Fuse, architects, Commercial Tribune building, for a 1-story, 60 x 100-foot machine shop to cost about $25,000.

CLEVELAND.—Friedman Bros., scrap iron dealers, recently purchased a 4½-acre site. Buildings and other improvements to cost about $50,000 are contemplated.

CLEVELAND.—The American Express Co. has filed application of plans at the city building office for a 2-story, 116 x 132-foot structure to cost $120,000.

CLEVELAND.—The Cleveland Electric Illuminating Co. has awarded the general contract for a $100,000 power plant to the Turner Construction Co.

CLEVELAND.—The Permanent Products Co. is having plans prepared by E. E. Clepper, architect, Pittsburgh, for a 50 x 275-foot factory building to cost about $38,000.

CLEVELAND.—The Brennan & McBride Co. has plans drawn by Architect Edward B. Hatch, Electric building, for a machine shop, to cost about $75,000.

CLEVELAND.—E. T. Scovill has made application for a permit to erect a 2-story, 32 x 190-foot factory building to cost about $50,000.

LAKEWOOD, O.—The Cleveland Welding & Mfg. Co. is having plans prepared for a 1-story power plant.

ORRVILLE, O.—The Ohio Blower Co., Cleveland, may locate a $100,000 plant in Orrville if satisfactory arrangements can be made with the city board of trade.

TOLEDO, O.—The Mutual Heating & Lighting Co., capitalized at $50,000, has been organized by William J. Biebeeheimer, Marvin M. Koos, W. L. Vail, H. A. Pollax and P. F. Parrott.

LOUISVILLE, KY.—The Roy C. Whayne Supply Co. is in the market for the following: Two traveling cranes, steam or electric, to handle a 1¼ or 1½-yard orange peel bucket at 25 feet; two orange peel buckets, capacity 1¼ or 1½ yards, and two 4-cubic yard clam-shell buckets, and two stiff-leg traveling derricks with 75-foot boom.

MIDDLESBORO, KY.—The Kentucky Mine Supply Co. has been incorporated with $75,000 capital by J. J. McCamey, Oscar Bishop and H. Oelerich.

NEWPORT, KY.—The Newport Rolling Mill Co., Joseph B. Andrews vice president, will erect a 75 x 120-foot addition.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Unit Ventilating Co. has been organized with $25,000 capital to engage in a business as mechanical and electrical engineer, in addition to conducting a business for the manufacture of ventilators. The incorporators are: A. Bautz, W. F. Brown and J. F. Maguire, 347 Fulton street.

NEW ROCHELLE, N. Y.—The Huguenot Motor & Supply Co. has been incorporated to manufacture motors, engines, etc., with $5500 capital. J. F. Phillips, A. B. Gilkes and P. Jenness are the incorporators.

NEW YORK.—The Tepper Fuel Corp., capitalized at $900,000, has been organized to deal in coal, coke, etc. by E. I. Kleinfeld, D. B. Baum and G. P. Brauburger, 1295 Madison avenue.

NEW YORK.—The W. J. Smyth Corp. has been organized with $20,000 capital to deal in machinery of all kinds, also foundry and factory supplies. The incorporators are: R. J. Smyth, A. A. Notzen and S. M. Louis, 51 Chambers street.

NEW YORK.—The National Water Motor Corp. has been organized with $250,000 capital to manufacture water motors. The incorporators are: F. E. Sturgis, R. Sherman and R. W. Evans, 14 Wall street.

NEW YORK.—The Imperial Machine & Foundry Corp., capitalized at $300,000, recently has been organized to engage in the manufacture of mill supplies, machinery, etc. H. Robinson, J. G. and R. A. Abramson, 60 Church street, are the incorporators.

WATERVLIET, N. Y.—The Ludlum Steel Co. is having plans drawn for an addition. Thornton W. Price, Woolworth building, New York, is the architect.

CHESTER, PA.—The Chester Shipbuilding Co. has been granted permission to erect 12 cradles for a new plant at Bristol. Two cradles also will be installed at the plant here.

HAZLETON, PA.—The Jeanesville Iron Works has let the contract to John G. Brown, Philadelphia, for a 50 x 100-foot machine shop and for making alterations to the cleaning and casting shop; total cost to aggregate

LANSDALE, PA.—Ground has been broken for a new building at the plant of the Barrows Mfg. Co. to replace that recently burned.

PHILADELPHIA.—The Frederick Whitaker Co. is having plans drawn for a 2-story, 40 x 70-foot factory.

PHILADELPHIA.—The Baldwin Locomotive Works has been granted a permit for a 3-story, 10 x 33-foot, side addition, to cost $2550.

PHILADELPHIA.—The general contract has been let to the Nickson, Duggan Construction Corp. by Henry Disston & Sons, for the erection of a 1-story, 40 x 100-foot building.

PHILADELPHIA.—The Ajax Metal Co. has let a contract to M. Ward Easby Inc. for the erection of a bridge to connect two of its buildings.

PHILADELPHIA.—The Haslett Chute Co. has been granted a permit to make alterations to the machine shop of Berean Bros., Twenty-third street and Westmoreland avenue.

PITTSBURGH.—The Inland Collieries Co., a subsidiary of the Inland Steel Co., Indiana Harbor, Ind., has let contracts for the establishment of a mining town near Harmarville, Pa., to be known as Indianola. The cost of the work is estimated at $650,000.

WILLIAMSPORT, PA.—Fire badly damaged the plant of the Williamsport Iron & Nail Co. on July 23.

CAMDEN, N. J.—Richter & Eschler have let the contract for a 2-story, 49 x 86-foot machine shop to cost about $7000.

ELIZABETH, N. J.—The Samuel L. Moore & Sons Corp. is having plans drawn for a plant extension. The architects are Ring & Gray.

NEWARK, N. J.—The West New York Tool & Machine Co., capitalized at $15,000, recently has been organized by Alois Seybro, E. Kolken and A. F. Wagner are the incorporators.

NEWARK, N. J.—A. C. Belknap, Inc., has been chartered with $100,000 capital to engage in the manufacture of automobiles, engines, boats, etc. Frank Van Syckle, Harold Van

Government Inquiries

The Navy Department, Bureau of Supplies and Accounts, Washington, D. C., is in the market for the following machine tools:

One 6-foot universal radial drill, 1378, no date, South Charleston, W. Va.
Four universal tool and cutter grinders, 1378, no date, South Charleston, W. Va.
Five 12-inch geared-head engine lathes, 1378, no date, South Charleston, W. Va.
Two 42-inch vertical drills, 1378, no date, South Charleston, W. Va.
One self-contained plain grinder, 1378, no date, South Charleston, W. Va.
Two constant-speed milling machines, 1378, no date, South Charleston, W. Va.
One electrically driven planer, 1378, no date, South Charleston, W. Va.
Three 15-inch shapers, 1378, no date, South Charleston, W. Va.
Two motor-driven vertical milling machines, 1378, no date, South Charleston, W. Va.
One 100-inch vertical boring and trimming mill, 1378, no date, South Charleston, W. Va.
One 24-inch motor-driven bevel-gear planer, 1377, no date, Philadelphia.
One 3-spindle, motor-driven drill press, 1378, no date, South Charleston, W. Va.
Two 6½-inch vertical electrically-driven shapers, 1378, no date, South Charleston, W. Va.

Schedule numbers and place of delivery follow the specifications of the tools. Further information may be had on application from the Navy Department, Bureau of Supplies and Accounts.

THE MILWAUKEE CRANE

The Milwaukee Crane

A crane embodying the elements of safety, substantial design and excellent construction; an organization composed of executives and engineers who have grown up with the crane business; a plant equipped with modern machine tools. *Prompt Delivery!* All of this is at your service.

THE MILWAUKEE CRANE

Milwaukee Electric Crane & Mfg. Co.

INCORPORATED

GENERAL OFFICES:

MILWAUKEE, WIS.

NEW YORK: 50 Church St.

PITTSBURGH: 704 Empire Bldg.

THE MILWAUKEE CRANE

Say you saw it in THE IRON TRADE REVIEW

Sychle and A. C. Belknap, East Orange, are the incorporators.

SAYREVILLE, N. J.—The T. A. Gillespie Co. has purchased 640 acres in Sayreville township and it is reported that it will erect a plant to cost about $3,000,000.

DOVER, DEL.—The United States Nitrates & Ammunition Co. has been newly organized with $100,000 capital to manufacture the products of nitrates of soda by William M. Underwood, George E. Wilson and Elmer E. Fowler.

WILMINGTON, DEL.—The Barnes Foundry Mfg. Co. has been incorporated lately with $2,000,000 capital to operate foundries, machine shops, etc. M. L. Gatchell, L. A. Irwin and Harry W. Davis are the incorporators.

BALTIMORE.—The Maryland Brass & Metal Works is taking bids on a 46 x 91-foot foundry, to cost approximately $15,000.

SPARROWS POINT, MD.—Bids will be received Aug. 1 by the Bethlehem Steel Co., care of William Tobias, South Bethlehem, Pa., on a 1-story, 65 x 200-foot plant to cost $200,000.

TOWSON, MD.—A 1-story, 50 x 100-foot factory and boiler house is to be erected by the Black & Decker Mfg. Co. S. D. Black, 109 South Calvert street, Baltimore, is in charge.

South of Mason-Dixon Line

CLEVELAND, TENN.—The Dixie Foundry Co. has been incorporated with $40,000 capital by S. B. Rymer, J. P. O'Neill, John S. O'Neal, P. B. Mayfield and Charles S. Mayfield.

KNOXVILLE, TENN.—The Hart Mfg. Co. of Grand Rapids, Mich., has applied for a Tennessee charter preliminary to moving its plant here. Capitalized at $60,000, the company was organized by D. A. Isely, E. R. Taylor, H. M. Taylor and others to manufacture heating and ventilating systems, sheet metal and brass articles, etc.

LEWISBURG, TENN.—The Lewisburg Stove Co. has been acquired by the Lewisburg Foundry Co. and will be enlarged so as to increase the capacity about 60 per cent. W. T. Archer is president of the company.

MEMPHIS, TENN.—The Jorgensen-Bennett Mfg. Co., capital $25,000, has been incorporated by H. J. M. Jorgensen, E. T. Bennett, J. L. West and others.

NASHVILLE, TENN.—The Knoblick Mining Co. has been incorporated in Delaware with $100,000 capital by J. B. Ramsey and others.

ROME, GA.—W. A. Smith, E. W. Kreider and others have incorporated the International Castings Co. with a capital of $10,000 to manufacture ranges, stoves, etc.

MILTON, FLA.—The Santa Rosa Marine Co. has been chartered to build ships with $30,000 capital by C. G. Murphy, R. S. Quina, J. E. Fuller and others.

The Pacific Coast States

AMERICAN LAKE, WASH.—The Chicago, Milwaukee & St. Paul railroad announces arrangements have been completed for constructing a spur line to the cantoment here.

BREMERTON, WASH.—The bureau of yards and docks, Washington, D. C., has extended the time for opening bids for the construction of a 9-story reinforced concrete, $500,000 storehouse at this yard.

INDEX, WASH.—G. N. Miller, Burke building, Seattle, has completed plans for the construction of an electric light plant for the city to cost $12,000.

NORTHPORT, WASH.—The Northport Power & Light Co., capitalized at $200,000, has filed articles of incorporation. Loren E. Campbell and others are the incorporators.

OLYMPIA, WASH.—The Puget Sound Steel Corp. has been incorporated with $5,000,000 capital by A. P. Gillies.

RIDGEFIELD, WASH.—The Henrici Reversing-Gear Mfg. Co. has been organized to manufacture mechanical specialties by R. E. Henrici and others.

SEATTLE.—The Mayer Life Boat Co. has been organized with $500,000 capital by M. F. Mayer and others.

SEATTLE.—L. H. Wakefield has organized the Liberty Packing Co. with $30,000 capital.

SEATTLE.—The Star Machinery Co. will erect a 3-story concrete building some time this fall to cost about $20,000. R. Rabel is secretary of the company.

SEATTLE.—The Seattle Chain Co. has been incorporated with $50,000 capital by H. E. Woolley and others.

TACOMA, WASH.—The Manganese Metal Co. has been organized by W. L. Hart with $300,000 capital.

TEKOA, WASH.—John H. Taylor, president of the Giant Ledge Mining Co., says the company will construct a mill of 150 tons capacity on the north fork of the Coeur d' Alene river.

WALLAWALLA, WASH.—The Guide Mfg. Co. has been incorporated with $100,000 capital by E. S. Cook.

SALEM, ORE.—The Coast Bridge Co., Portland, was awarded the contract for constructing a steel bridge between Polk and Marion counties at $237,804.

Dominion of Canada

HAMILTON, ONT.—The Dann Spring Insert, Inc., has been incorporated to manufacture automobile parts, springs and tools, with $40,000 capital, by George R. Harvey, Cecil V. Langs, Ewart G. Binkley and others.

LONDON, ONT.—The London Art Woodworking Co., 51 Nightingale street, will build an addition to its factory and a boiler house at a cost of $15,000. Joseph Keller, 1245 King street, is manager.

PETROLIA, ONT.—The town council will build a pumping station at a cost of $15,000. Mayor McRobie is chairman of the council.

War Stimulates Trade Movement

The Miller Gas Engine Co., Chicago, has changed its name to the Miller Engine Co.

The Charles L. Anderson Machinery Co., Chicago, has succeeded the Williams-Anderson Machinery Co., formerly of Chicago.

Announcement has been made of the dissolution of the Illinois Rail & Equipment Co., Chicago.

The Bonner Drop Forge Co. announces that the general offices of the company have been transferred from Chicago to Champaign, Ill.

The Duquesne Electric & Mfg. Co., Pittsburgh, electrical engineers and dealers in new and second hand equipment, has established a Cleveland office in the Marshall building, to be in charge of W. L. Moorehead, vice president.

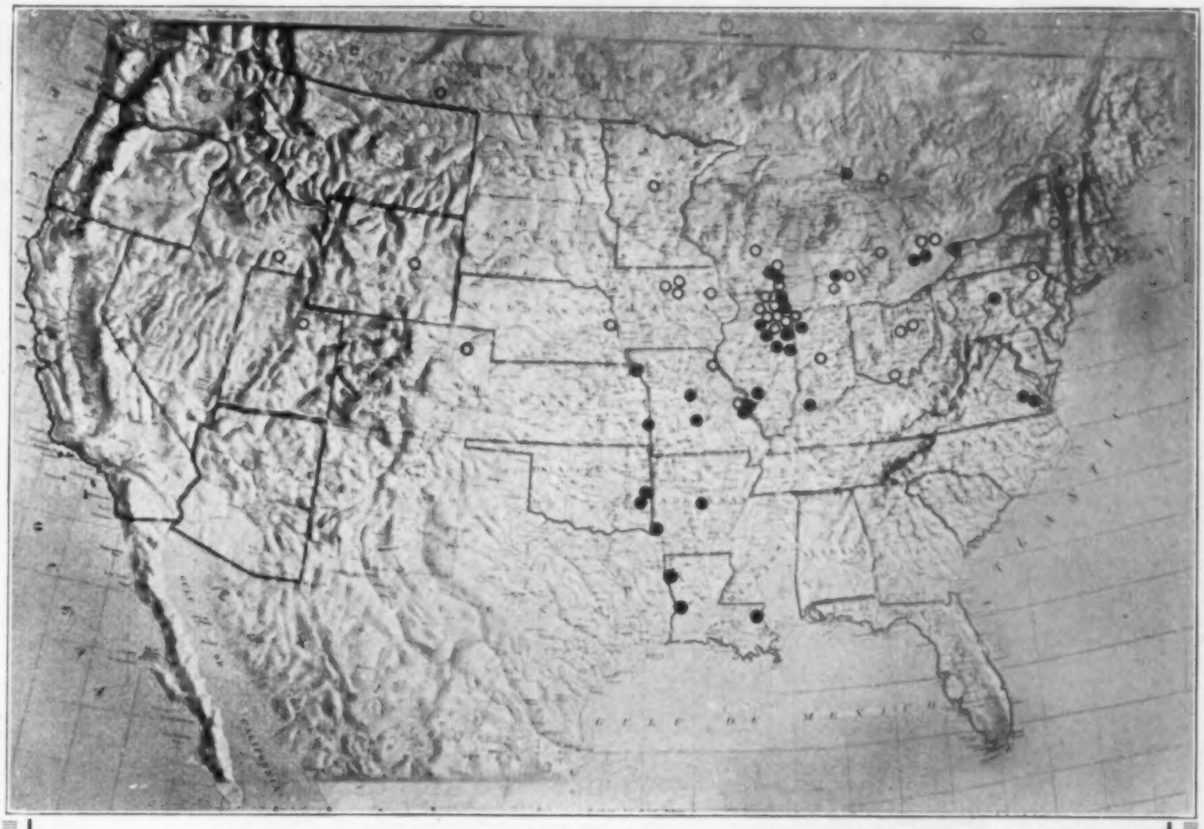
The Lackland-Payne Refractories Co., organized by Henry K. Lackland and James K. Payne, has opened offices at 1603 Boatmen's Bank building, St. Louis.

A new factory has been completed for the Aeromarine Plane & Motor Co., at Keyport, N. J., and the equipment of the Avondale plant removed.

A temporary closing of its Cincinnati offices has been announced by the Asbestos Protected Metal Co. of Pittsburgh, owing to the enlistment of E. G. Irwin, Cincinnati manager, in the Ohio National Guard.

Offices have been opened by the Aarora Brass Foundry Co., Pittsburgh, recently organized, at 2013 South Carson street.

Singer Reel & Taylor, Pittsburgh, have opened offices at 304 Wabash building, and will act as sales agents for the Acme Steel Co., Pittsburgh. The company also will handle alloys, coke and scrap.



○ Plants Designed and Supervised by The Arnold Company
● Plants Designed and Constructed by The Arnold Company

THE VALUE OF BROAD EXPERIENCE TO BUILDERS

A manufacturer operating on a large scale, with a number of scattered plants, desired to concentrate in the center of an established market. We were engaged to prepare the plans for the plant conforming to the manufacturing methods used in the past, but owing to our extensive and varied experience in industrial properties we were able to suggest entirely new methods. These better practices resulted in a material reduction in the cost of product as well as decreased first cost of plant.

The ideas were not all new except in application to this particular industry, being taken from other plants of entirely different character, but modified in form to suit requirements. We are frequently able to serve a client in this manner, sometimes affecting space requirements, sometimes the time element in manufacture, but always developing the **"maximum use factor"** of investment.

With a wide range of experience as to size of plant, character of plant, location of plant, climatic requirements, etc.; with a knowledge of markets for material and labor, and with well-developed method of cooperation between home and field offices, we are able to accomplish results in design and construction anywhere in the country.

Prospective builders can easily get in touch with manufacturers in their particular locality who have built Arnold planned factories. We will be pleased to send you names and addresses of those nearest you.

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL

CHICAGO, 105 South La Salle Street **NEW YORK, 111 Broadway**

New Trade Publications

ROCK DRILLS.—A 16-page bulletin, describing large drills for use in excavating work, etc., was recently published by the Chicago Pneumatic Tool Co., Chicago. The valve of the drill is a machined and hardened steel forging. The cylinder, said to be cast from a mixture of great tensile strength, is extended on its upper end to form a chamber for the rotating mechanism. A double side bearing is also employed. The piston rod and chuck are forged in one piece. The rotating mechanism for the drill is arranged to slip or release should the steel become bound in a hole while drilling in seamy or loose rock. The booklet is amply illustrated and contains tables for use in reference work.

TURRET LATHES.—Heavy duty turret lathes of two sizes, a 16-18 inch type "A" and a 24-26 inch type "B" machine are described in a catalog issued by the International Machine Tool Co., Indianapolis. Features of this line of lathes are: Semisteel bed cast in one piece with head stock and spindle box housings; flat ways with extensive bearing surfaces for both carriages and an undercut of 15 degrees to receive the adjustable taper gib; a sight indicator connected with the feed trip mechanism, so as to enable the operator to continue the feed by hand after the automatic trip has operated, and an attachment for heavy taper turning. The lathes are designed with a view toward rigidity and stiffness and are driven by constant-speed electric motors, belt connected.

IMPROVED TRACK APPLIANCES.—An illustrated booklet has been issued by the Lackawanna Steel Co., Buffalo, describing a safety-head angle bar and enumerating its advantages. A scientific distribution of metal, notably a depression of the metal in the head of the angle bar for a short space where the rail ends meet, preventing cutting or wearing due to the sharp under corners of the rail heads at the ends, is said to overcome the liability of fracture to the angle bar. The salient feature in this type of angle bar is that it retains its original rolled surface and finish without destruction or upsetting under the action of the wheels at the joint and in this condition is able to effectively resist the severe strain due to the upward thrust of the rail ends caused by the passing loads.

ELECTRIC HOISTS. — The Lidgerwood Mfg. Co., New York, is distributing an attractive bulletin of 32 pages devoted to electric hoists. It is claimed in the bulletin that all hoist parts are built on the duplicate part system from complete sets of standard gages and templates. Standard types of contractors hoists are said to be equipped with double-cone friction. The friction woods which are bolted on the gear wheel, are equipped with cork inserts. When not in operation the drum is loose on the shaft, a slight end movement along the latter causing it to engage with the friction woods on the gear wheel. The friction pin operates in a patented friction oil box where, it is claimed, it is always immersed in the lubricant. The drums are fitted with bronze shaft bushings.

MOTOR DRIVEN VENTILATING FANS.—The Sprague ventilating outfit, consisting of a motor, fan and tripod, for use in audience halls, theaters and factories, is described in a pamphlet recently issued by the Sprague Electric Works, New York. A specialty is made of direct-connected sets with round type motors of the direct current type of 115, 230 and 550 volts, or in the same type with 2 or 3-phase, 110, 220, 440 and 550-volt alternating current motors. Two kinds of fans are supplied; the Davidson propeller fan, or the Ventura disk fan. Fan sizes vary from approximately 18 to 48 inches, with a varying horsepower of approximately ⅛ to 2. Tables are appended giving probable air delivery in cubic feet per minute of the different types of fans.

PIPE THREADING MACHINERY.—The Landis Machine Co., Waynesboro, Pa., recently has issued a catalog of pipe and nipple threading and cutting machines together with a treatise on the Landis chaser. The Landis chaser is milled from flat bar steel. Salient characteristics are said to be its free cutting condition and the consequently high speed obtainable, its permanent throat and its adaptability for close nipple work. In the pipe and nipple threading machines, the carriage is gibbed to the bed in order to compensate for any wear. The chuck is fitted with hardened steel jaws, located diametrically opposite each other and lubricated by a rotary pump with a special control valve. The gears are inclosed to comply with factory inspection laws.

CHAIN HOISTS AND TROLLEYS.—High speed chain hoists sold under the trade name of "Cyclone" and various other types of chain hoists and pulley blocks are described in detail in a folder issued by the Chisholm & Moore Co., Cleveland, "Cyclone" hoists are designed with special attention to speed, durability, safety and dependability of working parts. These hoists are made in sizes ranging from ½ to 40 tons, with lifts of from 8 to 12 feet. Other types of hoists include anti-friction hoists, screw chain hoists and differential pulley blocks. Trolley frames, both geared and plain yoke types are manufactured in capacities up to 10 tons. Trolleys of the adjustable malleable frame type can be secured in capacities up to 12 tons. Prices and specifications are appended in conveniently arranged tables.

AIR COMPRESSORS.—Gas and gasoline driven air compressors are illustrated and described in a 24-page bulletin, recently published by the Chicago Pneumatic Tool Co., Chicago. These compressors are of the horizontal, straight-line, single-stage, double-flywheel, inclosed-frame type. Cast iron sub bases oak skids or portable tanks are furnished as desired. Splash lubrication, employed for the main bearings, crosshead guides, wristpin and crankpin is said to make the compressor practically self-oiling. The power cylinder is said to be of the valveless, two-cycle type, close regulation being secured by means of a fly ball governor, which regulates the gas and air admitted in accordance with the load demand. Thorough scavenging of the cylinder is said to be secured by means of a deflector on the piston.

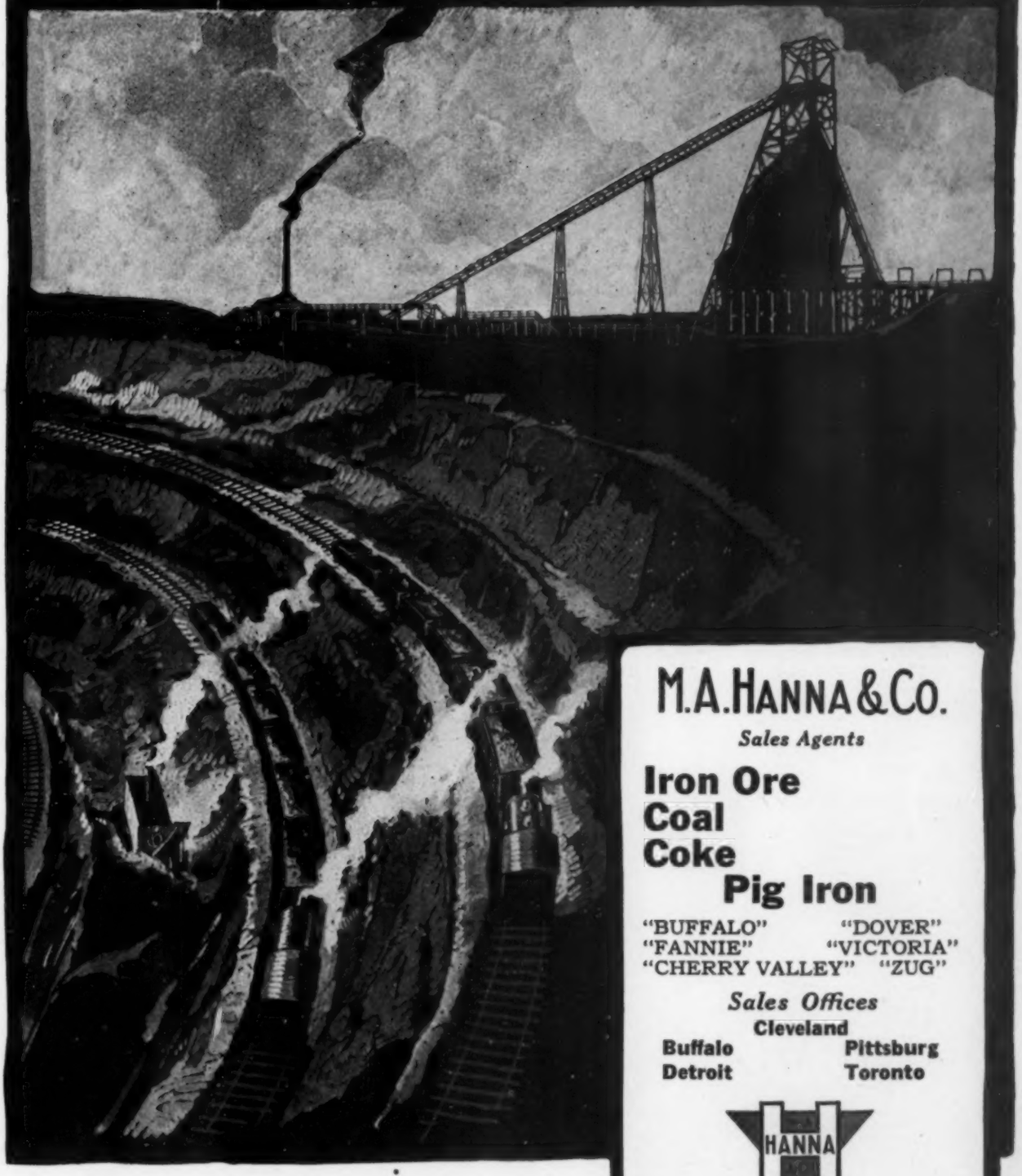
INDUSTRIAL LIGHTING FIXTURES.—A catalog issued by the National X-Ray Reflector Co., Chicago, describes its focal point reflectors and discusses the advantages of scientifically correct reflector design. In these focal point reflectors the imaginary center of luminosity of the lamp is placed at a point, such that the maximum reflection of the lamp's rays is produced. These reflectors are made of tough blown glass, fire glazed so that dust cannot adhere to them, and equipped with a silvered reflecting surface. A special system of spiral and vertical corrugations produces an even and well distributed light. Different types of reflectors for shops, store windows, commercial and industrial lighting purposes are illustrated. Building illumination and night illumination on construction work are dealt with in conjunction with the subject of X-Ray projectors.

METALLIC PACKING.—The C. Lee Cook Mfg. Co., Louisville, Ky., recently issued a 24-page bulletin devoted to metallic piston rod packing. The packing is maintained in a tight positon on the rod by the usual method of springs and followers. Diagrammatic views showing the arrangement of the various packing rings and accessories in the stuffing boxes of the single and double type are shown. Split metallic piston rod packing for use in steam engines, in refrigerating machinery is also described and illustrated. In the packing for Corliss engines a pipe is tapped into the stuffing box between the packing rings. The receiver pressure is thus utilized as a steam seal, balancing the atmospheric pressure. The entrance of steam can be throttled down by means of a globe valve on the pipe, and if the pipe is placed at the lowest position in the stuffing box it serves as a drain for condensation.

ALKALIS.—The Solvay Process Co., Syracuse, N. Y., is distributing a comprehensive bulletin devoted to descriptions of alkalis manufactured from carbonate of soda. The first portion of the booklet is given over to a brief outline of the soda process and to chemical formulas of the alkalis. Tables of value to consumers of soda ash by-products occupy about half the space in the bulletin and are probably its most important feature. These tables embrace the following: How to compare different systems of alkalimetry for soda ash and for caustic soda; properties of salt brines at different temperatures; solubility of soda salts; specific gravity of solutions of sodium carbonate and caustic soda; summary of shipping weights; atomic weights; and several others. The booklet is also handsomely illustrated, showing many interesting views of the Syracuse and Detroit plants of the company.

GRINDING AND POLISHING MACHINERY.—A reference book of unusual value describing its grinding and polishing machines and accessories has been issued by the Gardner Machine Co., Beloit, Wis. In addition to giving the general specifications with illustrations of the Gardner products, the new book contains considerable useful data regarding the use of abrasive discs and the nature of work which may be accomplished with the different machines. Cross-section views showing the details of construction of the ball bearings which are a feature of these machines and numerous illustrations of actual installations add to the interest of this new trade publication. Various machines made by the Gardner company include disc grinders for wood and metal, ring-wheel grinders, band-finishing machines and polishing and buffing lathes. Accessories such as chucks, wheel dressers, abrasive wheels and bands and cements are also described. The book is nicely arranged and is substantially bound with heavy board covers.

HANNA



M. A. HANNA & CO.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY" "ZUG"

Sales Offices

Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

HANNA

Iron and Steel Prices

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.	
Old range Bessemer, 55 iron	5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.	
Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	**5.00c**
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	**5.00c**
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	**4.95c**
Iron bars, Detroit	4.50c
Iron bars, St. Louis	4.45c
Iron bars, Cincinnati	**5.00c**
Iron bars, Philadelphia	5.00c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	**5.25c**
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	**5.25c**
Plates, Chicago	7.00c to 8.00c
Plates, Detroit	**9.00c to 10.00c**
Plates, St. Louis	7.05c to 7.55c
Plates, St. Paul	**7.10c**
Plates, New York	8.00c to 9.00c
Plates, Cleveland	7.50c
Plates, Philadelphia	**9.50c to 10.00c**
Plates, Cincinnati	**9.50c**
No. 10 blue anl. sheets, Chi.	9.50c
No. 10 blue anl. sheets, Cleve.	9.50c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	10.05c
No. 10 blue anl. sheets, Cinci.	9.50c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 10 blue annealed, Detroit	**9.50c**
No. 28 black sheets, Chicago	9.50c
No. 28 black sheets, Cleve.	9.50c
No. 28 black sheets, Cincin.	8.65c
No. 28 black, Detroit	**9.50c**
No. 28 black sheets, St. L.	10.35c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chicago	11.00c
No. 28 galv. sheets, Cleve.	11.00c
No. 28 galv. sheets, Cincin.	10.65c
No. 28 galvanized, Detroit	11.00c
No. 28 galv. sheets, St. L.	11.75c
Hoops, Cleveland	6.00c
Hoops, Detroit	**7.00c**

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$27.00 to 28.00
Bundled sheets, Cleveland	27.00 to 28.00
Bundled sheets, Buffalo	21.00 to 21.50
City wrought, short, N. Y.	27.00 to 28.00
Frogs, switches, guards, St. L.	35.00 to 35.50
Heavy melting steel, Pitts.	35.00 to 37.00
Heavy melting steel, Buffalo	33.00 to 34.00
Heavy melting steel, Chgo.	33.00 to 34.00
Heavy melt'g steel, Cleveland.	32.00 to 33.00
Heavy melting steel, Cincin	34.00 to 34.50
Heavy melting steel, east. Pa.	32.00 to 34.00
Heavy melting steel, N. Y.	27.00 to 28.00
Heavy melting steel, St. L.	35.50 to 36.00
Heavy melt'g steel, Birming.	**21.00 to 22.00**
Hydraulic pressed sh'ts, Cleve.	28.00 to 29.00
Hydraulic press. sheets, Pitts.	31.00 to 32.00
Hydraulic pressed sh'ts, Chgo.	25.00 to 25.50
Low phos. steel, Buffalo	45.00 to 48.00
Low phos. steel, Pittsburgh.	40.00 to 45.00
Low phos. steel, eastern Pa.	56.00 to 58.00
Shoveling steel, Chicago	30.00 to 31.00
Shoveling steel, St. Louis	29.00 to 30.00
Steel rails, short, Chicago	42.50 to 43.50
Steel rails, short, Cleveland.	38.00 to 39.00
Steel rails, short, St. Louis.	39.00 to 40.00
Steel rails, old, Birmingham.	**27.00 to 28.00**
Stove plate, Cincinnati	17.00 to 17.50
Stove plate, St. Louis	36.00 to 37.00
Stove plate, N. J. points	21.00 to 21.50
Stove plate, Birmingham	17.00 to 18.00
Stove plate, Buffalo	20.00 to 21.00
Stove plate, eastern Pa.	22.00 to 23.00

Corrected to Tuesday noon

Stove plate, Pittsburgh	23.00 to 23.50

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$20.00 to 21.00
Boiler plate, cut, No. 1, St. L.	19.00 to 19.50
Bundled sheets, Cincinnati	19.00 to 19.50
Knuckles, coup., Chicago	41.00 to 42.00
Knuckles, coup., St. Louis	39.00 to 40.00
Springs, Chicago	42.00 to 43.00
Stove plate, Chicago	19.00 to 20.00
Stove plate, Cleveland	21.00 to 22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	2.58
New York and Brooklyn (rail)	2.58
Virginia furnaces to:	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	20.00 to 21.00
Busheling, No. 1, Pittsburgh	25.00 to 27.00
Cast borings, New York	18.00 to 18.50
Cast borings, eastern Pa.	21.00 to 22.00
Cast borings, Buffalo	20.00 to 21.00
Cast borings, Pittsburgh	21.00 to 22.00
City wrought, long, New York	36.00
Forge flashings, small, Cleve.	29.50 to 30.00
Forge flashings, large, Cleve.	27.00 to 28.00
Forge, No. 1, eastern Pa.	23.50 to 25.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	19.00 to 19.50
Iron axles, Pittsburgh	50.00 to 52.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00 to 50.00
Iron rails, Chicago	40.50 to 41.50
Iron rails, Buffalo	43.00 to 44.00
Iron rails, Cincinnati	34.50 to 35.00
Iron rails, St. Louis	39.00 to 40.00
Iron rails, Cleveland	43.00 to 44.00
Machine turnings, Chgo.	17.50 to 18.50
Machine turnings, Buffalo	$18.00 to 19.00
Machine shop turnings, N. Y.	18.00 to 18.50
Mach. shop turnings, Pitts.	20.00 to 21.00
Mch. shop turnings, east. Pa.	19.00
Machine turnings, Birming.	11.00 to 12.00
R. R. mch. cast, No. 1, Buff.	30.00 to 31.00
R. R. wrought, 1, Buffalo	43.00 to 45.00
R. R. wrgt., No. 1, east. Pa.	47.50 to 50.00
R. R. wrought, No. 1, Pitts.	43.00 to 44.00
R. R. wrought, 1, B'ham.	**30.00 to 31.00**
Wrought pipe, Buffalo	**33.00 to 34.00**
Wrought pipe, eastern Pa.	34.00 to 36.00
Wrought pipe, New York	27.00 to 28.00

(Net Tons)

Angle bars, iron, Chicago	$36.00 to 37.00
Angle bars, steel, St. Louis.	30.00 to 30.50
Arch bars & transoms, St. L.	40.00 to 41.00
Arch bars & transoms, Chgo.	40.00 to 41.00
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.50 to 22.00
Busheling, No. 1, Cleveland.	25.00 to 25.50
Busheling, No. 1, St. Louis.	23.50 to 24.00
Busheling, No. 2, Chicago	20.50 to 21.00
Cast borings, Cincinnati	13.50 to 14.00
Cast borings, Cleveland	18.00 to 18.50
Cast borings, St. Louis	14.50 to 15.00
Cast borings, Chicago	**17.00 to 18.00**
Cut forge, Chicago	32.00 to 33.00
Grate bars, Cleveland	21.50 to 22.50
Iron axles, St. Louis	46.00 to 47.00
Iron axles, Chicago	**47.00 to 48.00**
Iron axles, Cleveland	47.00 to 47.50
Machine shop turnings, Chgo.	**18.00 to 19.00**
Mach. shop turnings, Cleve.	16.50 to 17.00
Machine shop turn'gs, Cinci.	13.50 to 14.00
Mach. shop turnings, St. L.	15.00 to 15.50
Pipes and flues, Cleveland	24.00 to 24.50
Pipes and flues, Chicago	22.00 to 23.00
Pipes and flues, St. Louis	20.00 to 20.50
Railroad wrought, 1, Cleve.	41.00 to 42.00
Railroad wrgt., No. 1, Chgo.	34.50 to 35.00
Railroad wrought, 1, Cinci.	34.50 to 35.00
Railroad wrought, 1, St. L.	34.00 to 34.50
Railroad wrgt., No. 2, Chgo.	33.00 to 34.00
Railroad wrought, 2, St. L.	31.50 to 32.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$26.50 to 27.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	41.00
Shafting, eastern Pa.	45.00 to 47.00
Steel car axles, Birmingham.	33.00 to 35.00
Steel car axles, New York	54.00
Steel car axles, Buffalo	45.00 to 50.00
Steel car axles, Cleveland.	51.00 to 52.00
Steel car axles, Pittsburgh.	50.00 to 55.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	39.00 to 40.00
Steel car axles, St. Louis	50.00 to 52.00
Steel car axles, Chicago	46.00 to 47.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$33.00 to 34.00
Car wheels, (steel), Pitts.	40.00 to 41.00
Car wheels, Chicago	32.00 to 33.00
Car wheels, eastern Pa.	36.00 to 38.00
Car wheels, Buffalo	33.00 to 35.00
Car wheels, New York	35.00
Car wheels, St. Louis	33.50 to 34.00
Car wheels, Birmingham	24.00 to 24.50
Car wheels, Cleveland	31.00 to 32.00
Tram car wheels, Birming.	22.00 to 22.50
Cast, No. 1, Birmingham	22.00 to 23.00
Cast, 1, machy., N. J. points	38.00
Cast, 1, heavy, N. J. points.	34.00 to 35.00
Cast, No. 1, eastern Pa.	34.00 to 36.00
Cast, No. 1, Pittsburgh	33.00 to 34.00
Malleable railroad, Cincinnati	26.00 to 26.50
Malleable railroad, Cleveland.	31.00 to 32.00
Malleable railroad, Buffalo	30.00 to 31.00
Malleable railroad, Pittsburgh	29.00 to 31.00
Malleable railroad, east. Pa.	32.00 to 34.00

(Net Tons)

Cast No. 1, Cleveland	30.00 to 31.00
Cast, No. 1, Chicago	28.00 to 29.00
Cast, No. 1, Cincinnati	24.50 to 25.00
Cast, No. 1, St. Louis	24.00 to 25.00
Malleable railroad, Chicago	30.50 to 31.50
Malleable railroad, St. Louis	22.00 to 22.50
Malleable agricultural, Chgo.	25.50 to 26.50

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$45.00
Reroll. rails, 5 ft. & ov., Chgo.	43.50 to 44.00
Reroll. rails, 5 ft. & ov., E. Pa.	45.00 to 50.00
Reroll. rails, 5 ft. & ov., St. L.	42.00 to 43.00
Reroll. rails, 5 ft. or ov., Cleve.	45.00 to 46.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	34.00 to 35.00
Locomotive tires, Chicago	50.00 to 51.00
Locomotive tires, St. Louis	47.00 to 48.00